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EMERGENCY FLOOD PLAN FORT PECK DISTRICT

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EMERGENCY FLOOD PLAN

FORT PECK DISTRICT

Revised
February 1952

Approved:

R. E. York

R. E. YORK
Colonel, Corps of Engineers
District Engineer



PREFACE

Prior to 1952 the Fort Peck District, Corps of Engineers, U. S. Army, has been preparing and distributing annually an Emergency Flood Plan. In the interest of economy the annual publication will be discontinued, and this 1952 edition of the Emergency Flood Plan will be used until major revisions become necessary. Minor revisions will be made by preparing revised sheets which will be furnished for insertion in this book.





E. B. DAWES

MISSOURI RIVER DIVISION
FORT PECK DISTRICT

ON 1 SHEET SHEET NO. 103°

U. S. ENGINEER OFFICE, FORT PECK, MONTANA NOVEMBER 1944

Drawn C. C. C.
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File No.



EMERGENCY FLOOD PLAN

FORT PECK DISTRICT

FEBRUARY 1952 REVISION

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EMERGENCY FLOOD PLAN

FORT PECK DISTRICT

FEBRUARY 1952 REVISION

1. AUTHORIZATION. The emergency flood plan has been prepared in accordance with instructions contained in paragraph 4223.06 of Orders and Regulations, dated 7 October 1949, which directs the preparation and distribution of a flood emergency manual for use by the Fort Peck District organization and other affected agencies.

2. PURPOSE OF EMERGENCY FLOOD PLAN. The purpose of the plan is to provide directions for the mobilization of personnel and facilities when flood danger becomes imminent and to outline the responsibilities and procedures of Fort Peck District personnel, before, during, and after floods.

3. AREA COVERED BY THE PLAN. The plan applies to the area lying within the geographical limits of the Fort Peck District. The present District boundaries will remain unchanged during a flood emergency, except at the discretion of the Division Engineer, Missouri River Division, or higher authority.

4. WHEN THE PLAN IS IN FORCE. This flood plan will be in force whenever it is apparent that serious flooding exists in the Fort Peck District, in no event later than the time when any of the flood stages listed in Appendix F are reached and higher flood stages are imminent, and will remain in effect until the responsibilities enumerated are fulfilled.

5. MISSION OF THE DISTRICT. The mission of the Fort Peck District prior to, during, and following flood emergencies is as follows:

a. Prior to floods.

- (1) To ascertain the extent and thickness of ice cover on streams and the distribution and depth of snow in the basin with particular attention to known critical points.
- (2) To inspect local flood protection works and check with local authorities with reference to proper operation thereof.
- (3) To make necessary preparation for impending floods.

b. During Floods.

- (1) To operate Fort Peck Reservoir for maximum flood protection.

- (2) To provide recommendations or instructions for the operation of storage reservoirs on tributaries of the Missouri River.
- (3) To gather, correlate and report flood information.
- (4) To protect life and assist in relief and rescue work.
- (5) To protect Corps of Engineer property and works.
- (6) To obtain engineering data.
- (7) To protect, repair, or strengthen levees and other flood control works threatened by floods as provided by the 1941 and subsequent Flood Control Acts.

c. After Floods.

- (1) To accomplish the rehabilitation of existing Corps of Engineers' works and the resumption of normal District functions.
- (2) To collect, develop, and make a matter of permanent record all engineering data for the entire flood period, including the making of damage surveys and the establishment of high water marks.
- (3) To revise and amplify engineering plans, particularly those for flood prevention and control.
- (4) To repair and restore levees and other flood control structures which have been damaged or destroyed by floods, as provided by the 1941 and subsequent Flood Control Acts.

6. CLASSIFICATION OF FLOODS. Floods will be classified according to duration and magnitude into the following three categories:

a. Category "A" Floods. Includes all major floods, exclusive of relatively localized floods, in which extensive property damage occurs, or serious danger to life or flood protection works prevails.

b. Category "B" Floods. Includes those classified as "flash-floods", together with all other relatively localized short duration floods in which crest stages are reached in a period of approximately 12 to 18 hours after heavy rainfall, during which high property damage or hazard to life is produced in local areas without contributing materially to dangerous flooding along larger rivers downstream.

c. Category "C" Floods. Includes flows which approach flood stages in relatively large drainage areas without having directly caused loss of life or significant property damage, but where such conditions prevail that in the event of additional heavy rainfall or snowmelt a major flood could be produced.

7. GENERAL REGULATIONS. The following regulations apply throughout the District organization during a flood emergency:

a. Subordination of normal work. Normal or routine duties will be subordinated to the performance of flood emergency operations. However, normal work will be prosecuted as vigorously as practicable by reduced units of the normal organization, utilizing personnel and facilities not required for emergency flood operations.

b. Reporting of flood conditions. In compliance with instructions contained in paragraph 4223.05 Orders & Regulations dated 28 March 1951, Subject: "Reports Required During Floods" (See Appendix C), teletype reports will be prepared by the Flood Reports Center, Operations Division, for forwarding to the Division Engineer, and also direct to the Chief of Engineers, marked "Flood Report, attention ENGKW", except that in special emergencies reports will be made by telephone to the Assistant Chief of Engineering for Civil Works, whenever it is determined that a flood of Category "A", "B", or "C" exists. Teletypes to the Chief of Engineers will be sent by commercial service to station "ARLINGTON 500" if facilities are available. Daily reports will be dispatched as early as possible but in no case later than 12 Noon (Local Time) until flood stages have receded. On Saturdays condensed reports, for category "A" and severe category "B" floods, will be made by Operations Division by teletype or by telephone to the Duty Officer in the Office of the Chief of Engineers. During critical stages of floods, supplementary reports will be dispatched to the Office of Chief of Engineers at the close of the day's business summarizing all significant changes which occurred during the day, or stating that no important changes have occurred.

c. Current information. In order that the District Office may be apprised of conditions existing in the flood area, all possible factual information of flood conditions and activities of emergency flood agencies will be collected by each field party and forwarded to the Flood Reports Center, Operations Division of the District Office as soon as practicable, to facilitate the release of reliable information to higher authority and to emergency rescue and relief organizations. Particular attention shall be given to supplying information on any emergency conditions which may affect action by this District; such as highway and railway closures, possible detour routes, functioning of rescue organizations, number of people evacuated, adequacy of food and medical supplies, housing conditions, communities isolated, and the extent of flooding in various communities. Because misleading reports from irresponsible sources are prevalent during emergencies, every effort shall be made to report pertinent and reliable facts to supply a dependable information pool for concerned agencies and organizations.

d. Record of activities. Each Division or Branch Chief shall provide for the maintenance of a chronological log of principal actions within his organization, and require that wherever necessary his subordinates on field duty shall keep a journal of reports made and orders received. Notes shall be made of actions taken and of reasons for following

any course of action in important cases, when acting without definite orders from superiors. Transcripts or memoranda of all telephone conversations will be prepared immediately after the call has been completed.

e. Distinctive insignia. Distinctive insignia (arm bands) should be worn by all employees of the District engaged in flood emergency work during the emergency period.

f. Rescue operations. Rescue operations will be left to rescue organizations such as the Red Cross or other local agencies in all cases where such an agency is functioning and has adequate facilities. Where necessary for the preservation of life and property the District will cooperate with such rescue organizations, and in isolated areas where no such agencies are organized the District will initiate and conduct rescue activities in cooperation with local authorities until relief operations can be assumed by rescue agencies. The District will be prepared to dispatch or use water transportation and rescue parties for the evacuation of inhabitants of flooded or threatened areas when, at the discretion of the District Engineer, such transportation and personnel may be spared from vital flood protection activities. The District will also be prepared for the possibility that troops of the Army Command in which the flood is occurring may be called upon to assume full charge of all rescue and evacuation work, either by direction of higher authority or by local arrangement. (See Appendix E, "Assignment of Troops and Aircraft to Flood Fighting Duties").

g. News releases. News releases will be made to the press and radio only with the prior approval of the District Engineer.

h. Policing: All policing of flood areas, except government reservations, will be left to local authorities and to military units in areas in which martial law has been established.

i. Release of flood predictions. Predictions relevant to crest stages expected during a flood is a function of the U. S. Weather Bureau, and predictions by personnel of the Fort Peck District, Corps of Engineers, will be released only with prior approval of the District Engineer. District personnel will limit public statements regarding expected flood conditions and flood stages to information concerning precipitation, current river stages, and predictions made by the Weather Bureau.

8. DISTRICT ORGANIZATION. Flood activities will be conducted by personnel trained in normal times for specific emergency duties. Upon receipt of information that flood conditions exist or are imminent in the District, each Division or Branch in the District shall report all personnel not engaged in flood work who can be spared from normal duties, to the Personnel Branch, who will prepare a list of all such personnel for distribution to the District Engineer, Executive Officer, and Division or Branch Chiefs. Additional personnel required by emergency flood units shall be requisitioned through the Personnel Branch as required by the Division or Branch Chiefs concerned. All emergency personnel assignments

and transfers, except between sections within a Division or Branch, shall be cleared through the Personnel Branch for purpose of record. Immediately after the Flood Plan is in force each Division and Branch Chief shall prepare a detailed organization chart, showing detailed assignments within his organization. Copies of these organization charts will be furnished to the District Engineer, Executive Officer, and to the Flood Reports Center, Operations Division. The specific flood emergency functions and responsibilities of personnel and units of the District during flood emergencies are as follows:

a. District Engineer. The District Engineer directs all activities of the District under this Flood Plan. When, in his judgment, flood conditions prevail in the Fort Peck District, he will direct that the reports as required by paragraph 4223.05, Orders & Regulations, dated 28 March 1951, be prepared.

b. Executive Officer. The Executive Officer will assist the District Engineer in the direction of flood activities. He will coordinate the District Office activities with field operations. He will supervise and coordinate the preparation of all plans and orders based on decisions of the District Engineer, and will establish and maintain liaison with other agencies.

c. Administrative Branches. The Executive Officer will direct and correlate emergency flood activities between branches of the Administrative Group, as follows:

- (1) Supply Branch. The Supply branch will be responsible for:
 - (a) Procuring materials and supplies required for the conduct of emergency flood operations.
 - (b) Handling of bills of lading in connection with shipments.
 - (c) Supplying information regarding location in the District of equipment and other accountable property which may be required for flood emergency operation.
 - (d) Investigating reports covering property lost, damaged, or expended during emergency operations, and assisting with inventories where necessary to determine shortages or overages of accountable Government property.
- (2) Office Service Branch. The Office Service Branch will be responsible for:
 - (a) Maintaining communications.

- (b) Preparing current lists of organizations or agencies which may require contacting in case of flood emergencies.
 - (c) Transcribing telephone conversations and performing stenographic and typing work.
 - (d) Issuing travel orders and transportation requests, and reservations for District Personnel.
 - (e) Maintaining the motor transportation pool.
- (3) Personnel Branch. The Personnel Branch will be responsible for:
- (a) Employing emergency personnel in connection with hired labor operations.
 - (b) Reassigning personnel to flood emergency operations.
 - (c) Maintaining an accurate record of time worked and preparing time rolls.
- (4) Fiscal Branch. The Fiscal Branch will be responsible for:
- (a) Procuring necessary funds to cover anticipated obligations in connection with flood activities.
 - (b) Paying invoices, expense account vouchers and reimbursement bills, and maintaining records of obligations and expenditures.
 - (c) Keeping accurate cost records in connection with flood activities in each location.
- d. Engineering Division. The Engineering Division will be responsible for:
- (1) Maintaining information at all times on conditions within the District which will affect operations under this plan including location of areas subject to flooding, location and character of existing flood control works, and emergency flood activities which may become necessary to save life and property in time of flood.
 - (2) Furnishing engineering personnel as required for formation of flood fighting and rescue parties.
 - (3) Collecting and recording engineering data for the entire flood period, both during and incident to the flood, for

use in preparing reports which may be used in the revision and amplification of engineering plans with respect to flood control in conformity with Orders and Regulations.

- (4) Procuring flood pictures; aerial, ground, moving and still. Pictures will be taken of ice jams, flooded areas, of structures damaged during the flood, and at crest stages, wherever and whenever possible. Arrangements will be made to procure commercial photographs whenever desirable for a complete record of the flood.
- (5) Making and coordinating field surveys.
- (6) Planning and designing all important emergency construction or repair activities.
- (7) Assisting in the inspection of field operations during emergency construction.
- (8) Developing engineering data for use in future revisions of engineering plans.
- (9) Collecting news articles, press releases and items from radio reports for record purpose in cooperation with the Public Relations Staff Assistant, the Office Service Branch, and Flood Reports Center of the Operations Division.
- (10) Making flood damage survey reports. Approximate estimates of damages shall be maintained during the progress of the flood and, as soon as possible after a flood has passed, a complete and accurate flood damage report shall be prepared.
- (11) Operating the regular stream gaging stations, maintained in connection with operation of the Fort Peck Reservoir, to obtain flood stage data.
- (12) Expanding the stream gaging system by arranging for regular reports from existing U.S.G.S., U.S.W.B. and State-owned gaging stations, not included in the regular Fort Peck stream gaging network.
- (13) Measuring flood discharges, either by District personnel or by arrangement with the U.S.G.S.
- (14) Preparing stage and discharge reports, and flood crest forecasts.

- (15) Maintaining a Flood Stage Reporting System, which will include, in addition to the stream gaging network covered in subparagraphs (11), (12), and (13) above, a flood stage reporting network consisting of an individual in each town or area subject to flooding who is responsible for submitting a report by telephone to the District Office whenever flooding appears imminent and who will be available to furnish river stage and condition data when called upon.
- (16) Making estimates of expected stream stages and furnishing desired Fort Peck Reservoir releases to the Chief, Operations Division, during any period of floods or possibility of floods below the Fort Peck Dam.
- e. Operations Division. The Operations Division will be responsible for:
 - (1) Flood Reports Center. An emergency organization which is responsible for:
 - (a) Assembling and correlating flood data and preparing information to show the flood situation throughout the District.
 - (b) Immediate posting of information received from any source concerning the closing of roads, railroads or airports, and the reporting of this information to the Executive Officer.
 - (c) Functioning as a clearing center for all information pertinent to emergency conditions, and assembling of such information for ready reference.
 - (d) Preparing all regular and any special reports required pertaining to floods or flood conditions, whether hourly, daily, or summary reports, including the daily teletype report to the Chief of Engineers.
 - (e) Assisting the Executive Officer in maintaining liaison with outside agencies.
 - (2) Organizing and dispatching to critical areas such flood observation and rescue parties as deemed necessary from information available and conditions prevailing.
 - (3) Directing Corps of Engineers' forces of the Fort Peck District engaged in direct rescue or flood fighting work for protection of life and Corps of Engineers' property, and supplementing rescue and flood fighting work of other

agencies when humanitarian considerations require it and local agencies normally responsible are unable to cope with the situation.

(4) Plant Repair Section. The Plant Repair Section will be responsible for:

- (a) Providing station wagons, jeeps, pickups, carryalls, and trucks as available during any period of flood emergency.
- (b) Furnishing necessary accessory equipment for automotive equipment such as spare tires, jacks, tire chains, shovels, etc.

(5) Maintenance Branch. The Maintenance Branch will be responsible for:

- (a) Organizing and assigning all plant required. This will include boats, life belts, life jackets, and accessory equipment, also sand bags, shovels and construction equipment or machinery. Operation or supervision of operation of plant will be provided as required.
- (b) Coordinating any hired labor operations performed in flood protection work during flood emergencies and furnishing employees and supervisors to the field for this type of work.

f. Construction Division. The Construction Division will be responsible for:

- (1) Constructing, reconstructing, or repairing flood protection structures or works, as authorized, after a flood emergency.
- (2) Directing, supervising and inspecting construction operations on flood protection projects performed by contract or by Government plant and hired labor.

g. All Organizational Units of the Fort Peck District, whether specifically mentioned or not in this plan, shall be prepared to perform such duties as are assigned by the District Engineer or Executive Officer.

9. FIELD OPERATIONS. The scope and extent of field operations will be determined by the flood potentialities prior to ice break-up and spring runoff, the seriousness of existing flood conditions and type of emergency operations indicated by the situation. Field operations will generally be divided into three categories:

a. Flood reconnaissance surveys. Prior to and during the annual ice break-up and spring runoff the Engineering Division will dispatch observers to observe and report to the Planning and Reports Branch of the Engineering Division, the following information:

- (1) General ice conditions; whether ice on stream is fixed or moving and condition of ice.
- (2) Extent and amount of snow cover.
- (3) Formation of any ice gorges, location, magnitude and time.
- (4) Conditions at ice gorges; whether water is impounded, passing through, around, or under the jammed ice.
- (5) Extent of flooding if any, nature of areas flooded.
- (6) Approximate time of formation and break-up of ice gorges.
- (7) Report on reaches of rivers surveyed with apparent flood potentialities.
- (8) A complete report will be furnished to the Chief of the Operations Division immediately after the above mentioned observations, examinations and contacts have been completed.

b. Prior to and during the annual ice break-up and spring runoff the Operations Division will dispatch observers to perform the following duties and make a complete report to the Chief of the Operations Division.

- (1) Examination of existing flood control works for present condition, needed repairs, and operating condition and contacts with local authorities to determine if provisions have been made for maintenance operation of local works during time of flood.
- (2) Determine if local authorities are planning to make required repairs of existing flood control works when need therefor exists.

c. Flood reconnaissance and rescue operations. When flooding appears imminent, reconnaissance and rescue parties will be dispatched to patrol stretches of the river where flooding may be expected. These parties will normally consist of one employee of the Engineering Division and two employees of the Operations Division who are familiar with river work. One employee will be designated Chief of Party and parties will receive their instruction from the Operations Division. Each party will be equipped with a station wagon or carry-all, boat, outboard motor, life vests, rubber boats, a small supply of sandbags, shovels and other small equipment

required in flood rescue work. Each party will, upon arrival at its assigned reach of the river, investigate existing conditions and determine which areas would flood first if river stages continue to rise and points at which ice jams would be likely to form, structures endangered by flood or ice jams, areas which would require evacuation of residents, livestock or property, present river stages, rate of rise, emergency work that may be required. The Chief of Party will immediately report his findings to the Flood Reports Center and receive any additional instructions as may be warranted under the conditions. If flooding is already in progress upon arrival at a designated reach of the river the Chief of Party will make a quick appraisal of the situation and call the District Office immediately, report all pertinent information and secure detailed instructions. It will be the responsibility of the Chief of Party to see that emergency flood operations are conducted in accordance with the policies and instructions contained herein.

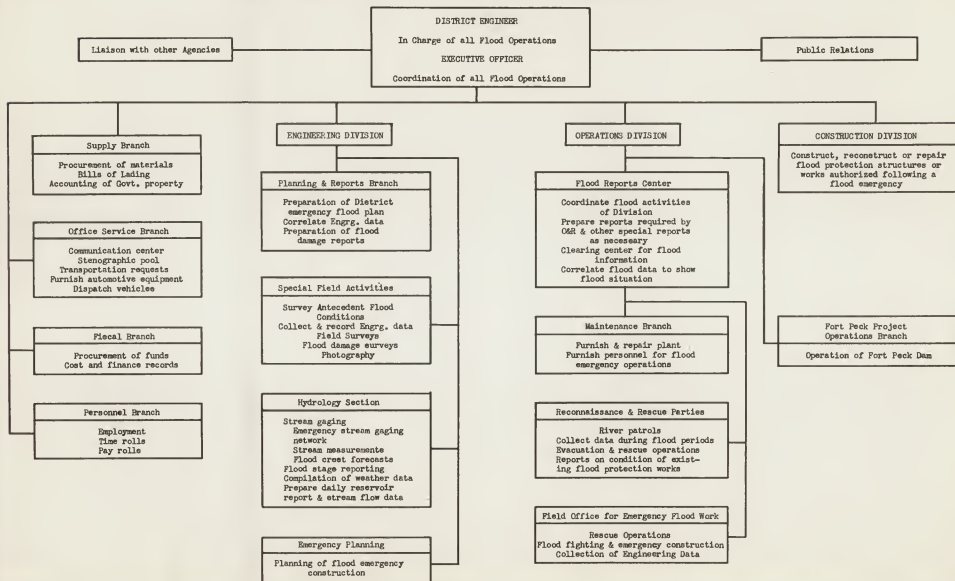
d. The chief of each field party engaged in flood emergency work will be responsible for reporting by telephone to the Flood Reports Center, as early as possible each morning but not later than 9:00 AM local time. The telephone report will consist of a brief on-the-spot summary of present conditions and of happenings since the last contact with the District Office. If conditions have not changed in the preceding 24 hours a call will be placed to report that fact. Sudden changes in conditions or important additional information will be reported immediately without waiting for the usual morning report. Calls outside office hours will be placed to the Chief, Operations Division, Assistant Chief, Operations Division, Executive Assistant, Executive Officer or District Engineer by placing a telephone call chargeable to telephone No. 90 with instructions to the operator to attempt to locate one of the above listed persons (order of preference as shown) at their residences or elsewhere. If telephone facilities are out of service, effort should be made to transmit the necessary information by telegram, amateur radio relay or any other possible means.

e. Flood fighting operations. If it becomes apparent to flood reconnaissance and rescue parties that the flood being covered will attain proportions too great for the party to cope with, or if a serious flood in any area develops, the District Office will be notified immediately. Sufficient employees, with necessary plant, boats, and materials will then be dispatched from the District Office, and if the situation warrants, a field office will be opened at the scene of the flood. A key employee of the District will be assigned by the District Engineer to take full charge of field operations in the flood area. This Field Engineer will report directly to the Chief of Operations Division and will be responsible for the conduct of Corps of Engineer operations in the area, and the coordination of field work with other flood activities of the District Office. The Field Engineer will cooperate and maintain liaison with local authorities, and representatives of rescue and relief organizations. In addition, he will insure the collection of all required engineering data, and the close observation of flood conditions and advance planning of such construction work as may become necessary. Emergency Construction work will not be initiated without prior approval of the District Engineer except in extreme emergencies to save life or very essential property.



APPENDIX A

FLOOD EMERGENCY FUNCTIONAL ORGANIZATION CHART





APPENDIX B

SUMMARY OF REPORTS PRIOR TO AND DURING FLOODS

Name of Report	Prepared by	Sent to	Due out of Sender's Office	Method of Transmission
Ice and Snow Cover	Field Personnel	Planning & Reports Branch	Reports made as warranted by conditions	Telephone and Letter
Flood Situation Reports	Chief of Field Parties	Flood Reports Center	Daily: before 9:00 a.m. and special reports when critical conditions indicate necessity	Telephoned in and then followed by written report
Log during flood	Flood Reports Center, Field Personnel Individual Logs	Executive Office Planning & Reports Branch	Daily at 11:00 a.m. At end of each Flood period	Messenger
Reservoir Report and Stream Flow Data	Hydrology Section	Division Engineer	9:30 a.m.	Teletype
Reports required by O&R 4223.05	Flood Reports Center	Division Engineer Office Chief of Engineers	12:00 noon	Teletype during week-days. Telephone or Teletype Saturdays, Sundays & Holidays to Duty Officer, Office Chief of Engineers



APPENDIX C
ORDERS AND REGULATIONS
PART II CHAPTER IV
REPORTS REQUIRED DURING FLOODS

1. Classification of Floods. Floods are classified into Categories "A", "B", and "C". The different categories of floods are described in paragraph 6 of page 2 of this Emergency Flood Plan.

2. Reports Required from Field during Floods. Field parties are required to report to the District Office each day a flood is in progress unless an emergency arises in the flood situation which would require immediate attention of the District Office, or unless otherwise directed by the District Office. In reporting Category "A" floods, daily reports will include general information on flood conditions, including lives lost, number of people evacuated from their homes, levee breaks, military installations or important production facilities endangered or flooded, railroads or major highways out of service, estimated damage at the time of reporting, river stage data including location of gage with stage height and time, weather data, special information particularly pertinent to the flood situation, together with information covering activities of the Corps of Engineers in rescue work and flood fighting. These reports will ordinarily be made by telephone to the District Office by nine a.m. In the event that telephone communications fail, other available means of communication will be used. Category "B" and "C" floods should be reported in similar manner unless otherwise directed by the District Office.

3. Reports Required from District Office. Instructions for the reporting of floods by the District Office is given in sub-paragraph b of "General Regulations" on page 3 of this Emergency Flood Plan. Flood reports prepared in the District Office shall conform with instructions contained in paragraph 4.22.05 "Reports Required During Floods" of Orders and Regulations.



APPENDIX D

INSTRUCTIONS TO FIELD PERSONNEL

1. General. Field personnel will be assigned to investigation of conditions existing in the various drainage areas comprising the Fort Peck District prior to the annual ice breakup and during the "June rise" caused by the spring rains and snow melt at higher elevations of the basin. Special parties will be assigned to flash cloudburst floods or other flooding which may occur at other times throughout the year.
2. The collection, correlation and recording of data prior to, during and after a flood is a vital part of the work to be performed by field parties and office personnel. These data are used in predictions, reservoir operations, flood reports and in future studies and designs. Field parties shall maintain a detailed written log of their observations, activities and data obtained. In addition they shall prepare daily reports of areas observed or individual flood areas prior to filing telephone reports to the District Office. Upon completion of verbal report to the District Office the daily written reports shall be mailed to the District Office. Further description of the data to be secured and action of observers is contained in the following paragraphs of this appendix. Supervisors will impress on members of field parties that field notes and sketches will be the only available record of many small details required in later studies, reports and investigations. Statements from observers as to their interpretation of the cause of a flood are especially valuable.
3. Data prior to flooding. Field personnel shall inspect all areas traversed, prior to actual flooding in such areas, for conditions which might cause floods or contribute to flood conditions. During such inspection personnel shall familiarize themselves with the various streams, making note of: thickness and amount of ice cover and its condition at the time of inspection, such as solid, honey-combed, slush, broken up, and size of any floating ice; amount of discharge; size and condition of channel; location of stream gages, and stream stage at time of inspection, if available; and land or property liable to flood damage at high stream stages. Observation and notes shall be made on the amount and depth of snow and surface soil conditions in all drainage basins.
4. A special effort shall be made to contact representatives of the U. S. Weather Bureau, U. S. Geological Survey, and State, County and local officials to obtain information on the flood conditions and problems in the area to be inspected.
5. In all towns visited during field trips where flood protection works have been constructed, an inspection of such works shall be made and note taken of the type, description, condition and construction of such works.

6. Personnel will keep themselves informed on weather conditions, temperatures and stream flow conditions at all times in the areas being inspected.

7. Field parties shall notify the District Office immediately when a critical situation is discovered or when in their opinion the data collected indicates a flood is imminent.

8. Data during flooding. Field personnel will report to the Flood Reports Center of the Operations Division by telephone before 9 AM each day outlining flood conditions during flooding or anticipated flooding and in addition will notify the Flood Reports Center immediately if additional personnel, rescue parties or flood fighting equipment are required. Close liaison will be maintained with U. S. Weather Bureau, U. S. Geological Survey, local officials, relief organizations during period of flood and all possible assistance shall be given these agencies. The following data will be collected in as complete detail as is available:

- a. High water data. Field parties will take gage readings as often as possible, or as directed, recording gage location, gage reading, time of reading and pertinent data about the river, such as number and size of ice flows, amount and thickness of ice cover and condition of channel. Hourly gage readings should be obtained, if possible, during periods of rising flood water and more often when the crest of the flood appears imminent. Flood crest gage height and time of crest should be obtained during all floods. Correlation of gage zeros to mean sea level elevations will be made by field parties, whenever possible, at all gages where this information is not already known. When a gage is not located at or near the area being flooded, flood crest heights should be marked on permanent structures and careful and complete notes taken on the location of these marks. Every effort should be made to mark flood crests on structures or other objects that have been previously used to reference flood heights. These marks should be correlated to mean sea level elevations, if possible, at the time of the flood or immediately after the flood period. All of the above information shall be transmitted to the District Office and to key personnel in the field when required by them as soon as possible after the factual data are obtained. Telephone, telegraph and messenger service will be utilized for transmittal of information as directed by the District Engineer.
- b. Bridge Data. Every effort should be made to obtain the following information at all bridges over streams that are subject to flooding.
 - (1) The clearance of the lowest members above the crest of the flood.

- (2) Whether or not the channel under the bridge is restricted.
- (3) Whether all water goes under the bridge or if some part by-passes across approaches.
- (4) Whether bridge is accessible during high water conditions.

c. Weather predictions and flood forecast. Information will be secured from the U. S. Weather Bureau on weather predictions available with respect to weather forecast, run off, and gage heights, and shall be incorporated with these data.

9. Characteristics and extent of flooding. The causes and events leading up to flood stages shall be noted in all flood areas. A sketch shall be prepared or information placed on available maps outlining the flood area and noting location of high water marks. Data for inclusion in the field parties log and daily reports shall include nature of area flooded, town or rural, numbers and types of structures flooded: Whether residential or business, with preliminary estimate of extent of flooding, damage incurred and local protection works affected; number and names of people drowned and accurate description of the cause or circumstance; railroad and road closures, and detour routes; effect of flood on water system, sewerage system and other utilities, including flooding of basements and service interruptions. Data shall be secured on existing flood control works, including extent of damage, areas overtopped and paths of overflow currents. If seepage is discovered on the landside of any levee, information shall be recorded as to the exact location, distance landward of levee, type of soil observed, apparent cause, amount of seepage, velocity of flow, difference in water elevation on the outside and inside of levee, method used to hold the seepage and any other information which may be of value in later investigations of seepage and internal drainage.

10. Evacuation and flood rescue operations. Information shall be recorded on activities of Corps of Engineer field parties and other agencies in flood warning, evacuation, and flood rescue operations, including plant used, number of families evacuated and number of people rescued.

11. Flood damage and flood damage surveys. Notes will be made and a preliminary estimate of flood damage on each area flooded will be prepared. Data will include area flooded, number of houses, business establishments, farms or farm buildings suffering flood damage. If only minor damage occurs in an area, a final type flood damage survey will be made so that investigators will not have to be sent into the area at a later date.



APPENDIX E

LIAISON TO BE ESTABLISHED

In the event of serious floods, such liaison as is indicated by the situation will be established by field representatives or the District Office with the officials, representatives, or agencies listed in this appendix.

AMERICAN RED CROSS. The American Red Cross is in a position to provide overland transportation, shelter, feeding centers, clothing, and other basic necessities of life during flood emergencies.

In cases of impending flood in the States of South Dakota, North Dakota and Wyoming, the District Office will immediately notify the

Assistant Manager
Disaster Service
Midwestern Area
American Red Cross
St. Louis, Missouri
Phone: Central 6720

In cases of impending flood in the State of Montana the District Office will immediately notify the

Assistant Director
Disaster Service
Pacific Area
American Red Cross
1550 Sutter Street
San Francisco 1, California
Phone: Graystone 4-1944

There will be a constant exchange of information during the development stages of the flood and if the situation warrants, a representative of the American National Red Cross will be stationed at the District Office by that organization to serve as liaison representative.

MAJOR DISASTERS. Public Law 875, approved 30 September 1950, authorizes the President, under certain conditions, to furnish Federal assistance to State and local governments in major disasters. The Act authorized him to operate through such Federal Agency as he may designate. By Executive Order No. 10221, dated March 2, 1951, the President has ordered the Housing and Home Finance Administrator, Raymond M. Foley, or his designated representatives, to exercise the authority conferred upon the President by Sections 3 and 5(a) of the Act. The Administrator selected the Community Facilities Service to represent him in continued contacts with Federal, State and local Governmental agencies and by the preparation of recommendation for invocation of the provisions of Public Law 875 when determined advisable.

Public Law 875 does not limit legislative authorities for action in a disaster period nor permit that funds available under Public Law 875 be utilized to defray expenses of such agencies operating under any other authority. It does, however, authorize the President to call upon any Federal agency for equipment, supplies, facilities or personnel available to them, and such authority has been delegated to the Housing and Home Finance Administrator.

For ready reference, the names and addresses of responsible officials and local officers of agencies with which liaison is likely to be established are tabulated on the following pages.

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON 25, D. C.

ENGCU 370.14

9 February 1948

SUBJECT: Assignment of Troops and Aircraft to Flood Fighting Duty

TO: President, Mississippi River Commission
Division Engineers, except Division Engineer, WOD
District Engineers except District Engineers Antilles, Grecian
and Panama Districts and Districts in WOD

1. The following procedures are prescribed for use of troops, signal communications and aircraft in connection with levee protection and maintenance during flood emergencies. They are not intended to conflict with the responsibilities of major military commanders as prescribed by AR 500-50 and AR 500-60.

2. a. The President, Mississippi River Commission and Division Engineers of areas other than those under the jurisdiction of the President Mississippi River Commission are authorized to establish direct communication, in connection with flood emergencies, with the following commanders for the purposes indicated.

Commanding Generals of appropriate armies. - Provision of necessary troops and signal communications.

Commanding Generals of appropriate air forces. - Provision of necessary aircraft for transportation and/or photographic reconnaissance.

b. Commanders of appropriate armies and air forces are those commanders in whose areas the flood emergency occurs. In this connection, the President, Mississippi River Commission is authorized direct communication with the Commanding General Second, Third, Fourth and Fifth Armies.

3. Request for additional assistance or for troop units directly under the control of the Chief of Engineers will be directed to the Chief of Engineers, attention: Operations and Training Division, Extension 73337.

4. Multiple letter ENGOU 370.14, 27 March 1947, subject: "Standard Operating Procedure for Assignment of Troops to Flood Fighting" is rescinded.

BY ORDER OF THE CHIEF OF ENGINEERS:

/s/ Chas. G. Holle
CHAS. G. HOLLE
Col, Corps of Engineers
Executive

HEADQUARTERS SIXTH ARMY
Presidio of San Francisco, California

AMGCT 319.1 (8 Aug 49)

8 August 1949

SUBJECT: Report on Matters of National Interest

TO: See Distribution

1. References:

a. Letter, this headquarters, AMGCT 319.1(13 June 49), subject as above, dated 13 June 1949.

b. Letter, this headquarters, AMGCT 319.1(5 July 49), subject as above, dated 5 July 1949.

The foregoing letters are revoked and the following substituted therefor:

2. This letter is directive to commanders of Class I and II installations, and to senior Army officers on duty in any locality in the Army Area where applicable. It is also a request to Air Force and Naval Installation Commanders in the Army Area.

3. In order that the Army Commander may obtain timely and accurate information of actual or impending disaster, major accidents of an unusual nature, and other events which may involve the employment of federal troops, it is desired that the senior officer on duty in each locality in the Army Area act as his representative in gathering information. The commander and/or the senior officer on duty in any locality in the Army Area will make a prompt and accurate report on incidents of conditions, actual or potential (such as domestic disturbances, tornadoes, explosions, floods, fires, earthquakes, etc.) which may involve or affect the Army. Report will be concise, will include an estimate of the situation, and will be made direct to this headquarters and not through channels. Intermediate commanders and adjacent commands will be notified where appropriate. Ordinarily the report will be made by priority telegram Attention AMGCT, but if the situation is considered critical long distance telephone to this headquarters will be utilized, WEST 1-6111, Extension 4366, during duty hours, or Extension 2497 after hours. For those who have no allotment of funds for communication services, the required report may be dispatched by official telegram as authorized by paragraph 14c, AR 105-25, and charged to Headquarters Sixth Army Appropriation 2100605 056-1602 P 440-04 304-479, or, in the event a long distance telephone call is necessary, such call may be made collect chargeable to this headquarters.

4. The foregoing report in no way supersedes other reports required by current directives of this or higher headquarters, which will be submitted at the time and through the channels required by such directives.

BY COMMAND OF GENERAL CLARK:

/s/ Theodore Gall
THEODORE GALL
WOJG, USA
Asst Adjutant General

HEADQUARTERS SIXTH ARMY
Presidio of San Francisco, California

AMGPL-G 370.1

6 October 1950.

SUBJECT: Disaster Relief Operations

TO : See Distribution

1. Sixth Army Disaster Relief Plan 1950, now current, governs the participation of the Federal Armed Forces in providing assistance to the civil authorities in emergencies beyond the capabilities of local or other civilian governmental agencies.

2. Paragraph 5, Responsibilities, of cited plan establishes Sixth Army policy in this respect, "Armed Forces assistance . . . will be given only after civilian resources are known to be inadequate.

3. In the past, furnishing of troop assistance has been more or less on a liberal basis and there has been frequent assistance in local emergencies, particularly in fighting forest fires.

4. Under the current critical manpower situation, assistance of this nature must be curtailed, and requests from civilian authorities will be complied with only under circumstances of extremely serious emergency, clearly and unquestionably beyond the capabilities of the civil agencies concerned.

5. The Governors of the several States and the Regional Chiefs of the United States Forestry and National Park Services have been advised of this change of policy and have agreed to request assistance only under conditions of utmost seriousness.

6. The Sixth Army Disaster Relief Plan 1950 (Short Title 6A-DRP-50) is being revised in this respect and an amendment to the Plan will be forwarded to your headquarters in the immediate future.

7. All commanders will insure that this policy is fully understood and complied with.

8. THE ABOVE IS A DIRECTIVE TO COMMANDERS OF CLASS I INSTALLATIONS AND TO COMMANDERS OF CLASS II AND US AIR FORCE INSTALLATIONS INSOFAR AS IT IS APPLICABLE IN CONNECTION WITH THE RESPONSIBILITY OF THE ARMY COMMANDER AS PRESCRIBED IN SR 10-500-1, 11 APRIL 1950 OR BY DIRECTION OF HIGHER HEADQUARTERS.

BY COMMAND OF LIEUTENANT GENERAL WEDEMAYER:

/s/ M. F. Grant
M. F. GRANT
Colonel, AGC
Adjutant General

LOCAL OFFICIALS

<u>Basin</u>	<u>State</u>	<u>Town</u>	<u>Name</u>	<u>Office</u>	
Yellowstone	Montana	Sidney	Curtis Ball	Mayor	
"	"	Sidney	R. C. Pierce	County Surveyor	
"	"	Sidney	C. A. Hansen	Police Chief	
"	"	Glendive	Claude Eyer	City Engineer	
"	"	Miles City	Kurt Wiel	City Engineer	
"	"	Miles City	F. L. Denson	Mayor	
"	"	Forsyth		Mayor	
"	"	Forsyth	F. F. Palmer	City Engineer	
"	"	Billings	Thomas Rowe	Mayor	
"	"	Billings	Thomas D. Hurdle	County Surveyor	
"	"	Billings	Kenneth Chrysler	City Engineer	
"	"	Billings	Ben B. Hagerman	County Commissioner	
"	"	Laurel	Peter Thomson	Mayor	
"	"	Big Timber	Art Ellison	Supervisor of Roads	
"	"	Livingston	J. R. Cortese	City Water Supt.	
Big Horn	Wyoming	Thermopolis	H. O. Betzer	Mayor	
"	"	Thermopolis	Paul N. Klos	City Clerk	
"	"	Worland	Ray F. Bower	Mayor	
"	"	Worland	Noel Morgan	City Clerk	
"	"	Basin	T. E. Fredin	Publisher of "Re- publican Rustler"	
"	"	"	P.P. Anderson	Mayor	
"	"	"	Basin	Claude R. Davis	City Clerk
"	"	"	Manderson	H. H. Bender	Mayor
"	"	"	Manderson	Florence Roberts	City Clerk
"	"	"	Greybull	C. H. Christensen	Mayor
"	"	"	Greybull	George A. Clark	City Clerk
"	"	"	Greybull	Lynn E. Severance	Publisher of "The Greybull Standard"
"	"	"	Kane	Oliver C. May	Gage Reader
"	"	Montana	Crow Agency	L. C. Lippert	Supt of Indian Agcy
Shoshone	Wyoming	Lovell	Frank Brown	Chm.Co.Commissioner	
Tongue	Wyoming	Monarch	C. M. Shott	Vice-Pres. in charge of oper. Sheridan- Wyo. Coal Co.	
"	"	Dayton	Arthur J. Dickson	Teacher	
"	"	Acme Power House	M. R. Knapp	Chief Engineer	
Goose Creek	Wyoming	Sheridan	D. A. Ruff	Mayor	
"	"	Sheridan	Paul Anderson	City Engineer	
Powder	Montana	Broadus	Ashton Jones	Publisher of "The Powder River County Examiner"	

Basin	State	Town	Name	Office
Powder	Wyoming	Arvada	C. F. Heath	Business Man
Clear Creek	"	Buffalo	W. V. Holland	Mayor
Missouri	Montana	Ft. Benton	J. P. Jordan	Mayor
"	"	Culbertson	W. A. Whitcomb	U.S. Weather Bureau Observer
"	"	Poplar	Stanley Nees	County Commissioner
"	"	Townsend	Louis Green	Mayor
Jefferson	"	Twin Bridges	Ira Edwards	City Engineer
"	"	Three Forks	Mr. McLees	Mayor
Smith River	"	White Sulphur Springs	Elmer Chye	Mayor
Sun River	"	Great Falls	Truman Bradford	Mayor
" "	"	Great Falls	Fred Sanborn	Sec. Sun River Soil Conservation Dist.
" "	"	Augusta	L. G. Murphy	U. S. Weather Bureau Observer
" "	"	Sun River	C. A. Bull	Postmaster
Marias River	"	Shelby	R. D. Voorhies	Water Superintendent
Milk River	"	Saco	C. P. Martin	Mayor
" "	"	Saco	R. J. Kurtz	Water Superintendent
" "	"	Harlem	C. H. Dolven	Mayor
" "	"	Harlem	R. J. Gwaltney	City Clerk
" "	"	Chinook	Carl King	City Engineer
" "	"	Havre	Oval Hatler	Mayor
" "	"	Havre	E. J. Pepin	City Engineer
Musselshell	"	Harlowton	Charles F. Walton	Clerk & Recorder
"	"	Roundup	Jim Hunter	Co. Commissioner
"	"	Ryegate	H. G. Todd	Clerk & Recorder
Grand & Missouri				
reau Rivers	S. Dak.	Mobridge	William S. Wrigley	Mayor
" "	"	Mobridge	C. W. Whitney	Gage Reader
" "	"	Shadehill	R. W. Hager	Postmaster
" "	"	Fort Yates	H. N. Clark	Supt. Indian Agency
" "	"	Dupree	E. J. Brammer	County Commissioner
" "	"	Cheyenne Agcy.	C. Thorberg	Roads Engineer
Belle Fourche	"	Belle Fourche	O. H. Frost	Mayor
" "	"	Belle Fourche	Ben Wood	City Engineer

<u>Basin</u>	<u>State</u>	<u>Town</u>	<u>Name</u>	<u>Office</u>
Cheyenne	S. Dak.	Lead	A. J. M. Ross	Mayor
"	"	Lead	S. C. Berry	City Engineer
"	"	Deadwood	E. Rypkema	Mayor
"	"	Deadwood	R. L. Ewing	Consulting Engineer
"	"	Deadwood	Ray Smith	County Engineer
"	"	Sturgis	Katherine Soldat	Mayor
"	"	Sturgis	LeRoy Leach	City Engineer
"	"	Spearfish	James T. O'Neill	Mayor
"	"	Rapid City	Harold Babcock	City Manager
"	"	Rapid City	A. L. Haines	Mayor
"	"	Hot Springs	George Doling	Mayor
"	"	Hot Springs	Jack Elliot	City Manager
"	Wyoming	Moorcroft	Frank Goehring	Const. Engr. U.S.B.R.

HIGHWAY ENGINEERS

<u>Basin</u>	<u>State</u>	<u>Town</u>	<u>Engineer</u>	<u>Address</u>
Yellowstone	Montana	Glendive	William K. Brittain	Div. Maint. Engr. Montana State Highway
Yellowstone	Montana	Miles City	Milo Lahn	Div. Maint. Engr. Montana State Highway
Yellowstone	Montana	Billings	Phillip Brittain	Div. Maint. Engr. Montana State Highway
Big Horn	Wyoming	Basin	J. E. Walter	Maint. Engr. Wyoming State Highway
Big Horn	Wyoming	Worland	Fred Seward	Proj. Engr. Wyoming State Highway
Tongue	Wyoming	Sheridan	J. H. Meyers	Maint. Engr. Wyoming State Highway
Missouri	Montana	Butte	Joseph Mulligan	Div. Maint. Engr. Montana State Highway
Missouri	Montana	Wolf Point	Bruce T. Randall	Div. Maint. Engr. Montana State Highway
Missouri	Montana	Bozeman	George A. Barrett	Div. Maint. Engr. Montana State Highway
Missouri	Montana	Great Falls	Clinton McGiffin	Div. Maint. Engr. Montana State Highway
Missouri	Montana	Lewistown	A. E. Harcharik	Div. Maint. Engr. Montana State Highway
Milk	Montana	Havre	H. J. Price	Div. Maint. Engr. Montana State Highway
Cheyenne	S. Dak.	Rapid City	W. A. Kingsbury	Dist. Engr. S. Dak. State Highway
Cheyenne	S. Dak.	Pierre	T. B. Hillmer	Dist. Engr. S. Dak. State Highway
Cheyenne	Wyoming	Newcastle	H. R. Baldwin	Maint. Engr. Wyoming State Highway

CHIEF ENGINEERS OF STATE HIGHWAY DEPARTMENTS

<u>State</u>	<u>Headquarters</u>	<u>Engineer</u>
Montana	Helena	Troy Carmichael
South Dakota	Pierre	H. C. Rempfer
Wyoming	Cheyenne	J. R. Bromley, Supt.

MAINTENANCE ENGINEERS OF STATE HIGHWAY DEPARTMENTS

<u>State</u>	<u>Headquarters</u>	<u>Engineer</u>
Montana	Helena	E. B. Martin
Wyoming	Cheyenne	W. E. Sutton

STATE HIGHWAY PATROLMEN

Basin	State	Town	Patrolman	Address	Phone
Yellowstone	Mont.	Sidney	John W. Corder	714 E. Stanhope	134
"	"	Glendive	Douglas A. Hardesty	616½ N. Kendrick	319M
"	"	Miles City	Melvin M. Mooney	9 South 9th	535W
"	"	Miles City	Kenneth G. Talbot	1805 Fort St.	409NR
"	"	Forsyth	Anton G. VanRisswick	703 Willow	335
"	"	Billings	*John C. Flanagan	202 Burlington	7877
"	"	Billings	Louis O. Aleksick	344 Alderson	3794
"	"	Billings	Wm. C. Benson	311 Wyoming	9-1152
"	"	Billings	Lynn C. Armstrong	518½ Wyoming	8486
"	"	Billings	Sgt. Harry G. Brunham	333 Broadwater	8205
"	"	Billings	Jack M. Marshall	2037 Orchard Lane	9-9223
"	"	Billings	Elmer A. Martin	1007 No. 27th	2365
"	"	Billings	Donald F. Mercer	112 Ave. C.	7091
"	"	Columbus	F. E. Brown	Box 292	139M
"	"	Livingston	Norris V. Lean	324 So. 3rd St	
"	"	Livingston	J. H. Anderson	715 W Crawford	893M
"	"	Red Lodge	Dale V. Stinson	503 No. Haggin	660
Big Horn	"	Hardin	Robert H. Bragg	717 No. Cody	81
Missouri	"	Wolf Point	Orrie E. Woods	Benton St.	139
"	"	Great Falls	*Cecil H. Storm	17 9th St NW	7577
"	"	Great Falls	Sgt. Wm. P. Cahill	515 10th St. N	2-4908
"	"	Great Falls	Albert E. Fousek	806 5th Ave N	9590
"	"	Great Falls	Peter Gaasch	806 1st Ave SW	3007
"	"	Great Falls	A. E. Buck, Jr.	2305 4th Ave S	5553
"	"	Great Falls	Cecil O'Brien	Black Eagle	4754
"	"	Great Falls	Jack M. Riggs	2214 2d Ave No.	2-2710
"	"	Lewistown	A. C. Vanek	1115 N. Water	1104
"	"	Roundup	Gilbert E. Musgrove	29½ Main	258W
"	"	Plentywood	Paul G. Barick	202 N. Adams	260
"	"	Butte	Thos. J. Cahill	Leonard Motel	3914
"	"	Butte	A. W. Boehme	2622 Princeton Ave	2-2136
"	"	Butte	Jesse G. Fryett	657½ Colorado St	2-5417
"	"	Butte	H. A. Slack	718 So. Dakota	6987
"	"	Butte	Wm. M. Madlena	2205 Hazel St.	9151
"	"	Butte	Sgt. A. E. Stephenson	912 W Platinum	2-4311
"	"	Helena	Ralph W. Everett(Radio)	511 No. Rodney	854J
"	"	Helena	Clifford M. Small	419 Hayes	3410
"	"	Helena	Alfred H. Mues	1508 Poplar	1646M
"	"	Helena	Walter H. Lyons	1011 5th Ave	2734
"	"	Townsend	Eddie J. Price, Jr.		

<u>Basin</u>	<u>State</u>	<u>Town</u>	<u>Patrolman</u>	<u>Address</u>	<u>Phone</u>
Missouri	Mont.	Bozeman	W. O. Thornby	221 S Bozeman	1329
"	"	Bozeman	E. J. Mora	1022 S Willson	934
"	"	Three Forks	John H. Lindstrand		82
"	"	Harlowtown	Paul V. Dayerle		
"	"	Whitehall	Glen A. Stevens	Box 264	194
"	"	Dillon	Royal S. Archer		
Marias	"	Cut Bank	A. H. Anderson	114 7th Ave SE	315
"	"	Shelby	Tom Yost	Box 837	685
Teton	"	Conrad	Robert C. Blewett	514 Illinois Ave	171
"	"	Choteau	Henry M. Helf	Box 357	121
Milk	"	Glasgow	Hugh Borton	339 5th Ave So	322R
"	"	Malta	Arnold Lehman	229 Whitcomb St	222
"	"	Chinook	John A. Garland		3520
"	"	Havre	Haston J. Broadus	736 2nd St	1026
Cheyenne	S.Dak	Custer	Loyd Zellhoefer		131R
"	"	Rapid City	Capt. Orville Worman		3751W
"	"	Rapid City	H. N. Russell		4849W
"	"	Rapid City	John Warren		3071J
"	"	Spearfish	Marvin Heim		9M
Grand & Moreau	S.Dak	Lemmon	George I. Samis		523
"	"	Mobridge	Wayne Bunch		2413

Patrolman may also be contacted in South Dakota through the Central Station at Pierre, and through KAB 116, Rapid City, South Dakota.

A patrolman may be contacted in Wyoming by inquiring at the Sheriff's office in the town where a patrolman is needed and the Sheriff's office will make contact with the nearest patrolman by radio.

* Assistant Supervisor



APPENDIX F

FLOOD STAGE REPORTING SYSTEM & FLOOD STAGES

1. General. In the event of flooding or impending floods in the Fort Peck District, the following persons will inform this office or may be contacted for information, on river stages and flood conditions in their locality:

<u>River</u>	<u>Town</u>	<u>Name</u>	<u>Designation</u>
Madison	Three Forks, Mont.	Ray Bacon	Montana Power Co.
Madison	Ennis, Mont.	Charles Bauer	Chm. Madison Cty. Comm.
Missouri	Trident, Mont.	Paul S. Chesterfield	Asst. Supt. Ideal Cement Plant
Missouri	Cascade, Mont.	R. C. Burger	Editor, Cascade Cron.
Missouri	Townsend, Mont.	Frank T. Hooks	County Attorney
Missouri	Great Falls, Mont.	Carl Lemmar	County Engr.
Missouri	Ft. Benton, Mont.	J. P. Jordan	Mayor
Missouri	Wolf Point, Mont.	Wm. M. Blankenship	Gage Reader
Jefferson	Silver Star, Mont.	George Bryant	Postmaster
Jefferson	Waterloo, Mont.	Guy George	Dairy Owner
Jefferson	Whitehall, Mont.	Al Smith	Co. Commissioner
Jefferson	Whitehall, Mont.	Glen A. Stevens	Highway Patrol
Beaverhead	Dillon, Mont.	Ned Pilgrim	Parisian Cleaners
Beaverhead	Dillon, Mont.	Herbert Wheat	Real Estate Agent
Beaverhead	Twin Bridges, Mont.	Ira Edwards	City Engineer
Big Hole	Reichle, Mont.	Ellwood Boucher	Postmaster
Smith	White Sulphur Springs	Elmer Chve	Mayor
Sun	Augusta, Montana	L. G. Murphy	Weather Bureau
Sun	Fairfield, Mont.	George Ebner	Supt Sun R. Project
Sun	Sun River, Mont.	C. A. Bull	Postmaster
Sun	Great Falls, Mont.	L. W. Upshaw	Red Cross
Marias	Shelby, Mont.	R. D. Voorhies	Water Supt.
Marias	Loma, Mont.	H. W. Pope	
Marias	Loma, Mont.	---	RR Station Agent
Teton	Ft. Benton, Mont.	Frank Clark	County Surveyor
Musselshell	Martinsdale, Mont.	Mrs. Lamb	Charles Bair Ranch
Musselshell	Harlowton, Mont.	Charles F. Walton	Co. Clerk & Recorder
Musselshell	Harlowton, Mont.	A. D. Eggenberger	Mayor
Musselshell	Roundup, Mont.	Jim Hunter	Co. Commissioner
Musselshell	Roundup, Mont.	F. E. Leibetrau	City Engineer
Musselshell	Roundup, Mont.	Mrs. Louis Wilhemi	Gage Reader
Musselshell	Ryegate, Mont.	H. G. Todd	Co. Clk & Recorder
Milk	Harve, Mont.	E. J. Pepin	City Engineer
Milk	Chinook, Mont.	Carl King	City Engineer

<u>River</u>	<u>Town</u>	<u>Name</u>	<u>Designation</u>
Milk	Harlem, Mont.	C. H. Dolven	Mayor
Milk	Malta, Mont.	U.S. Bur. of Recl.	
Milk	Saco, Mont.	R. J. Kurtz	Water Sup't.
Milk	Glasgow, Mont.	Roman C. Fargo	City Engineer
Milk	Nashua, Mont.	Jennie M. Geer	Gage Reader
Yellowstone	Livingston, Mont.	James L. Anderson	Gage Reader
Yellowstone	Livingston, Mont.	J. R. Cortese	City Engineer
Yellowstone	Livingston, Mont.	J. L. Cowan	Co. Assessor
Yellowstone	Big Timber, Mont.	Art Ellison	Supervisor of Roads
Yellowstone	Billings, Mont.	John Murphy	Gage Reader
Yellowstone	Billings, Mont.	Tommy Hurdle	Co. Surveyor
Yellowstone	Billings, Mont.	D. E. Hagemen	Mgr. Water Dept.
Yellowstone	Huntley, Mont.	G. W. Meade	Businessman
Yellowstone	Hysham, Mont.	Ernest Fenton	Co. Attorney
Yellowstone	Hysham, Mont.	Orville Campbell	Co. Clk & Recorder
Yellowstone	Forsyth, Mont.	F. F. Palmer	City Engineer
Yellowstone	Miles City, Mont.	Kurt Weil	City Engineer
Yellowstone	Miles City, Mont.	Dave Kalfall	Gage Reader
Yellowstone	Terry, Mont.	Walter Johnson	City Council
Yellowstone	Fallon, Mont.	Leonard Johnson	Fallon Merc.
Yellowstone	Glendive, Mont.	R. C. Pierce	Co. Surveyor
Yellowstone	Sidney, Mont.	Lower Yellowstone Irr.	Association
Yellowstone	Sidney, Mont.	John Schmidt, Jr.	Gage Reader
Yellowstone	Fairview, Mont.	W. W. Wintermute	G.N. Depot Agent
Shields	Livingston, Mont.	J. L. Cowan	Co. Assessor
Shields	Clyde Park, Mont.	Selma Fahrman	Gage Reader
Clark Fork	Bridger, Mont.	W. A. Moody	Chief of Police
Big Horn	Greybull, Wyo.	G. Clark	Town Treasurer
Big Horn	Kane, Wyo.	Oliver C. May	Gage Reader
Big Horn	Worland, Wyo.	G. M. Donnel	Co. Surveyor
Big Horn	Worland, Wyo.	Clint Rasmussen	Insp. CAA
Big Horn	Manderson, Wyo.	Elza Johnson	Mayor
Big Horn	Thermopolis, Wyo.	Roy F. Edwards	City Engineer
Little Big			
Horn	Crow Agency, Mont.	V. S. Kubitz	
Paintrock Cr	Hyattville, Wyo.	Samuel Hyatt	Rancher
Shoshone	Lovell, Wyo.	Frank Brown	Co. Commissioner
Shoshone	Lovell, Wyo.	Fred Lynn	Sheriff
Shoshone	Kane, Wyo.	Alvin W. Adams	
Tongue	Decker, Mont.	H. H. Kistemann	Gage Reader
Tongue	Dayton, Wyo.	Bly Dickson	
Goose Creek	Sheridan, Wyo.	Paul Anderson	City Engineer
Powder	Arvada, Wyo.	H. B. Crawford	Gage Reader
Powder	Broadus, Mont.	Ashton Jones	Mayor
Grand	Shadehill, S.D.	Mr. Hager	Postmaster
Grand	Shadehill, S.D.	Otto Weinkauff	Gage Reader
Grand	Little Eagle, S.D.	Don Sprouse	USIS Farm Agent
Grand	Haley, N.D.	J. E. Crawford	Postmaster

<u>River</u>	<u>Town</u>	<u>Name</u>	<u>Designation</u>
Moreau	Cheyenne Agency	C. Thorberg	Road Engineer
Moreau	Cheyenne Agency	John Drissen	Range Manager
Moreau	Promise, S. D.	Ed Ducheneaux	Postmaster
Moreau	Faith, S. D.	H. M. Crowell	Const. Engr. USBR
Cheyenne	Edgemont, S. D.	C.B.&Q. R.R. Co.	
Cheyenne	Edgemont, S. D.	Pat Colgan	Mayor
Cheyenne	Oral, S. D.	Wayne Kasmer	Businessman
Cheyenne	Wasta, S. D.	Bob Bruce	Mayor
Cheyenne	Wasta, S. D.	Jack Trople	Sec. Foreman CB&Q RR
Belle Fourche	Belle Fourche, S.D.	Ben Wood	City Engineer
Belle Fourche	Belle Fourche, S.D.	O. H. Frost	Mayor
Spearfish Cr	Spearfish, S. D.	James T. O'Neill	Mayor
Bear Butte Cr	Sturgis, S. D.	Katherine Soldat	Mayor
Rapid Cr	Rapid City, S. D.	Harold Babcock	City Manager
Whitewood Cr	Deadwood, S. D.	R. L. Ewing	Consulting Engineer
Whitewood Cr	Lead, S. D.	Stephen C. Berry	City Engineer
Fall River	Hot Springs, S. D.	Jack Elliot	City Manager
	Helena, Montana	U. S. Geological Survey	
	Denver, Colorado	U. S. Geological Survey	
	Pierre, South Dakota	U. S. Geological Survey	
	Sheridan, Wyoming	U. S. Geological Survey	



FLOOD STAGES IN FORT PECK DISTRICT

Stream	Reach or Town	Flood Stages		Remarks
		Gage Height Ft.	Approx. Disch. C.F.S.	
Missouri River	Three Forks to 2 miles below Townsend	9.3	20,000	Toston Gage
	-Trident		30,000	
	-Townsend		30,000	
	Canyon Ferry to Holter Dam		30,000	
	Holter Dam to mouth of the Sun River	13.2	20,000	Backwater from sanitary system causes damage at lower discharge
	-Craig		40,000	
	-Ulm		50,000	
	Mouth of the Sun River to mouth of the Marias River		30,000	
	-Great Falls		50,000	
	-Fort Benton		80,000	
Beaverhead River	Mouth of Marias River to Fort Peck Reservoir	12.0-12.5	50,000	Loma and Zortman Gages
	Armstead to Twin Bridges	3.8	2,000	Barratts Gage
	-Dillon		3,000	Small outlying district at Dillon subject to flooding by Beaverhead river
	-Twin Bridges		3,000	Flood water overflows from Big Hole River into Beaverhead above Twin Bridges
Madison River	-Three Forks	14		To overtop levee near Three Forks
Jefferson River	Twin Bridges to Three Forks		10,000	
	-Three Forks		15,000	



FLOOD STAGES IN FORT PECK DISTRICT

Stream	Reach or Town	Flood Stages		Remarks
		Gage Height Ft.	Approx. Disch. C.F.S.	
Marias River	Tiber Damsite to mouth of Cottonwood Creek	9.6	10,000	
	Cottonwood Creek to mouth	9.7	10,000	
	-Loma		50,000	
Milk River	Fresno Dam to Harlem	4.5	2,000	Area north of Milk River will start flooding at approximate elevation of 2474.0 feet M.S.L. Lohman Gage
	-Chinook	20.0	8,000	
	Harlem to Nelson Reservoir outlet		8,000	
	-Malta		15,000	Nashua Gage Levee protects main portion of city
	Nelson Reservoir Outlet to mouth	20.0	10,000	
	-Glasgow		57,000	
Yellowstone River	-Livingston	7.0-3.3		7.0 U.S.G.S. gage-3.3 City Water Plant gage. elev. causes flooding to begin on "Ninth St. Island". 2 feet more caused flooding to begin at Sacajawea Park Flooding confined to land and structures near the river To overtop levee at Billings Levee protects main portion of city
	-Billings	11.5		
		16.7		



FLOOD STAGES IN FORT PECK DISTRICT

Stream	Reach or Town	Flood Stages		Remarks
		Gage Height Ft.	Approx. Disch. C.F.S.	
Yellowstone River	-Miles City	13.0	.	Levee overtopped at 21.0 gage reading. 13.0 flood stage for unprotected area
	-Forsyth		175,000	To overtop levee system
	-Glendive	17.0		Town not subject to flooding from open water floods. Water over banks 10 foot stage
	-Sidney			Town not subject to flooding. Ice jams have caused flooding in surrounding areas
Big Horn River	Boysen Dam to Worland		10,000	
	-Thermopolis	8.6	10,000	
	Worland to Greybull		12,000	
	-Manderson	10.0	12,000	
	Greybull to Yellowtail Reservoir	8.2		
	-Greybull		15,000	
	Yellowtail Dam to Hardin	4.75	25,000	51,000 c.f.s. to overtop levee
Owl Creek (Wyo.)	Hardin to mouth	9.0	28,000	
	Anchor Damsite to mouth of North Fork	6.0	1,000	
	North Fork to mouth		1,500	
Powder River	Middle Fork Damsite to mouth of North Fork		1,500	
	Mouth of North Fork to Moorhead Damsite		5,000	



FLOOD STAGES IN FORT PECK DISTRICT

Stream	Reach or Town	Flood Stages		Remarks
		Gage Height Ft.	Approx. Disch. C.F.S.	
Powder River	Moorhead Damsite to mouth of Little Powder River	6.7	5,000	
	Mouth of Little Powder River to Powderville	6.6	8,000	
	Powderville to Locate	7.2	10,000	
	Locate to mouth		12,000	
Cheyenne River (includes Beaver Creek, Wyoming)	Edgemont Damsite to mouth of Beaver Creek		15,000	26 river miles in this reach
	Mouth of Beaver Creek to Angostura Reservoir	7.7	8,000	
	Angostura Dam to downstream end of Angostura Gravity Unit		15,000	
	Downstream end of Angostura Gravity Unit to mouth of Rapid Creek		20,000	
	Rapid Creek to mouth of Belle Fourche River	8.5	20,000	
	Belle Fourche River to mouth	8.7	25,000	
	Keyhole Damsite to Hulett	12.1	3,000	
	-Hulett	13.0	15,000	
Belle Fourche River	Hulett to Belle Fourche		5,000	25,000 c.f.s. to overtop levee
	-Belle Fourche		5,000	
	Belle Fourche to Butte-Mead County Line	6.2	8,000	
	Butte-Mead County Line to mouth		25,000	



FLOOD STAGES IN FORT PECK DISTRICT

Stream	Reach or Town	Flood Stages		Remarks
		Gage Height Ft.	Approx. Disch. C.F.S.	
Hay Creek	-Belle Fourche		2,300	To overtop levee
Fall River	-Hot Springs		25,000	To overtop Channel Improvement
Grand River	Shadehill Dam to Bluehorse			
	Damsite (SW of Watauga)	10.5	5,000	
	Bluehorse Damsite to			
Moreau River	Bullhead		5,000	
	Bullhead to mouth	11.2	6,000	
	Bixby Damsite to Usta		5,000	
	Usta to Dupree		7,000	
	Dupree to Whitehorse	12.0	8,000	
	Whitehorse to Promise	16.2	9,000	
	Promise to mouth		10,000	



APPENDIX G

Stream Gaging Stations in Fort Peck District

Stream	Station	Location and Description
Missouri River	Toston, Mont.	Water-stage recorder, 2 miles southeast of Toston.
Missouri River	Wolf Creek, Mont.	Water-stage recorder, $1\frac{1}{4}$ miles downstream from Holter Dam near Wolf Creek.
Missouri River	Fort Benton, Mont.	Water-stage recorder, at highway bridge at Fort Benton.
Missouri River	Loma, Mont.	Water-stage recorder, at Loma, $\frac{1}{2}$ mile downstream from Marias River.
Missouri River	Zortman, Mont.	Water-stage recorder, at power-plant ferry, 30 miles southwest of Zortman.
Missouri River	Fort Peck, Mont.	Water-stage recorder, $3\frac{1}{2}$ miles upstream from Milk River and 8 miles downstream from Fort Peck Dam. Long-distance receiving recorder located in Fort Peck Powerhouse.
Missouri River	Wolf Point, Mont.	Water-stage recorder, at highway bridge, State Highway No. 13, 6 miles southeast of Wolf Point.
Missouri River	Williston, N. Dak.	Water-stage recorder and wire-weight gage, at Lewis and Clark Highway bridge 7 miles west of Williston and 25 miles downstream from Yellowstone River.
Red Rock River	Lakeview, Mont.	Water-stage recorder, at Kennedy Ranch, 14 miles northwest of Lakeview.
Red Rock River	Monida, Mont.	Water-stage recorder, just downstream from Lima Reservoir and 8 miles northwest of Monida.
Red Rock River	Dell, Mont.	Water-stage recorder, $\frac{1}{2}$ mile downstream from Sage Creek and $4\frac{1}{2}$ miles northeast of Dell.
Red Rock River	Red Rock, Mont.	Wire-weight gage at Red Rock.



Stream	Station	Location and Description
Beaverhead River	Barratts, Mont.	Water-stage recorder, 1 mile upstream from Barratts and $8\frac{1}{2}$ miles southwest of Dillon.
Beaverhead River	Blaine, Mont.	Wire-weight gage, at highway bridge at Blaine, 14 miles northeast of Dillon.
Beaverhead River	Dillon, Mont.	Wire-weight gage, at Dillon.
Beaverhead River	Dillon, Mont.	Wire-weight gage, near Dillon.
Horse Prairie Creek	Grant, Mont.	Water-stage recorder, below Bloody Disk Creek.
Blacktail Creek	Dillon, Mont.	Water-stage recorder, SE $\frac{1}{4}$ Sec. 14, T9S, R8W.
Grasshopper Creek	Dillon, Mont.	Water-stage recorder, NW $\frac{1}{4}$, Sec. 26, T8S, R10W.
Rattlesnake Creek	Dillon, Mont.	Water-stage recorder, NE $\frac{1}{4}$, Sec. 15, T6S, R10W.
Sheep Creek	Dell, Mont.	Water-stage recorder, Sec. 35, T13S, R10W, 6 miles southwest of Dell.
Ruby River	Alder, Mont.	Water-stage recorder above reservoir, at Puller Hot Springs 10 miles south of Alder.
Ruby River	Alder, Mont.	Water-stage recorder, above Warm Springs Creek, near Alder.
Ruby River	Alder, Mont.	Water-stage recorder, about 200 feet upstream from county bridge $2\frac{1}{2}$ miles south of Alder.
Ruby River	Laurin, Mont.	Water-stage recorder, about 200 feet downstream from county bridge, in Laurin, $\frac{3}{4}$ of a mile upstream from mouth of Alder Creek.
Ruby River	Sheridan, Mont.	Wire-weight gage, at county bridge $3\frac{1}{2}$ miles southwest of Sheridan.



Stream	Station	Location and Description
Ruby River	Sheridan, Mont.	Wire-weight gage, below mouth of Ramshorn Creek.
Ruby River	Twin Bridges, Mont.	Water-stage recorder, at county bridge $1\frac{1}{4}$ miles upstream from mouth and $2\frac{1}{2}$ miles south of Twin Bridges.
Big Hole River	Melrose, Mont.	Water-stage recorder, at highway bridge 8 miles south of Melrose.
Big Hole River	Jackson, Mont.	Water-stage recorder, 9 miles southwest of Jackson.
Whitetail Creek	Whitehall, Mont.	Water-stage recorder, near Whitehall.
Jefferson River	Sappington, Mont.	Water-stage recorder at bridge on State Highway 1, $\frac{1}{2}$ mile north of Sappington.
Birch Creek	Reichle, Mont.	Water-stage recorder, SE $\frac{1}{4}$, Sec. 15, T5S, R10W.
Miner Creek	Jackson, Mont.	Water-stage recorder, 7 miles southwest of Jackson.
Trail Creek	Wisdom, Mont.	Water-stage recorder near Wisdom.
Boulder River	Basin, Mont.	Water-stage recorder, 12 miles west of Basin, above Rock Creek.
Boulder River	Boulder, Mont.	Water-stage recorder, at highway bridge 2 miles east of Boulder.
Willow Creek	Harrison, Mont.	Water-stage recorder, $2\frac{1}{2}$ miles northeast of Harrison and 11 miles upstream from mouth.
Willow Creek	Willow Creek, Mont.	Staff gage, SW $\frac{1}{4}$ Sec. 18, T1S, R1E.
Norwegian Creek	Harrison, Mont.	Water-stage recorder, 4 miles southeast of Harrison.
Madison River	Grayling, Mont.	Water-stage recorder, 500 feet downstream from Hebgen Dam, 16 miles northeast of Grayling.



Stream	Station	Location and Description
Madison River	McAllister, Mont.	Water-stage recorder, 500 feet downstream from Madison Power Plant 2 miles downstream from Madison Reservoir, 5 miles northeast of McAllister, 7 miles southeast of Norris.
Taylor Creek	Grayling, Mont.	Water-stage recorder, 17 miles north of Grayling.
Hyalite Creek	Bozeman, Mont.	Water-stage recorder, 7 3/4 miles south of Bozeman.
Bridger Creek	Bozeman, Mont.	Water-stage recorder, 3 miles northeast of Bozeman.
East Gallatin River	Bozeman, Mont.	Water-stage recorder, at Bozeman.
Gallatin River	Gallatin Gateway, Mont.	Water-stage recorder, 8 miles south of Gallatin Gateway.
Gallatin River	Gallatin Gateway, Mont.	Water-stage recorder, at Axtell Bridge near Gallatin Gateway.
Gallatin River	Belgrade, Mont.	Water-stage recorder, near Belgrade, Mont.
Gallatin River	Manhattan, Mont.	Water-stage recorder, near Manhattan, Mont.
Gallatin River	Logan, Mont.	Water-stage recorder, 1/2 of a mile west of Logan.
Prickly Pear Creek	Clancy, Mont.	Water-stage recorder, 4 miles north of Clancy.
Tenmile Creek	Rimini, Mont.	Water-stage recorder, 3 miles north of Rimini.
Tenmile Creek	Helena, Mont.	Water-stage recorder, 1 1/2 miles west of Helena.
Sixteen Mile Creek	Ringling, Mont.	Staff gage at Ringling.
Sheep Creek	White Sulphur Springs, Mont.	Wire-weight gage, 16 miles north of White Sulphur Springs, 7 miles upstream from Moose Creek.



Stream	Station	Location and Description
Dearborn River	Clemons, Mont.	Water-stage recorder, near Clemons.
Dearborn River	Craig, Mont.	Water-stage recorder, 10 miles northwest of Craig.
Newland Creek	White Sulphur Springs, Mont.	Water-stage recorder, 13 miles north of White Sulphur Springs.
Newland Creek	White Sulphur Springs, Mont.	Staff gage, below Damsite, near White Sulphur Springs.
Smith River	Eden, Mont.	Water-stage recorder above Hound Creek near Eden.
Sun River	Vaughn, Mont.	Water-stage recorder, 5 miles southeast of Vaughn and 10 miles upstream from mouth.
Muddy Creek	Vaughn, Mont.	Wire-weight gage at old highway bridge at Vaughn.
Smith Creek	Augusta, Mont.	Water-stage recorder, below Fork Creek and 8 miles southeast of Augusta.
North Fork Sun River	Augusta, Mont.	Water-stage recorder, North Fork of North Fork, 1 mile above South Fork of the North Fork.
Belt Creek	Monarch, Mont.	Water-stage recorder near Monarch.
Marias River	Shelby, Mont.	Water-stage recorder, 200 feet downstream from highway bridge, U.S. Highway 91, 7 miles south of Shelby.
Marias River	Brinkman, Mont.	Water-stage recorder, 4 miles southwest of Brinkman Post Office.
Two Medicine River	Browning, Mont.	Water-stage recorder near Browning.
Badger Creek	Browning, Mont.	Water-stage recorder near Browning.



Stream	Station	Location and Description
Teton River	Farmington, Mont.	Water-stage recorder, 20 miles west of Farmington.
Judith River	Utica, Mont.	Water-stage recorder at Noel Ranch $3\frac{1}{2}$ miles downstream from confluence of South and Middle Forks and 10 miles upstream from Utica.
Wolf Creek	Stanford, Mont.	Water-stage recorder near Stanford.
Big Spring Creek	Lewistown, Mont.	Staff-gage, $\frac{1}{2}$ mile downstream from Big Springs, 5 miles southeast of Lewistown.
Ross Fork	Hobson, Mont.	Water-stage recorder, 1 mile downstream from Hawk Coulee, $3\frac{1}{2}$ miles east of Hobson.
Cottonwood Creek	Lewistown, Mont.	Staff-gage, NE $\frac{1}{4}$ Sec. 19, T14N, R18E, and 8 miles south of Lewistown.
Wolf Creek	Stanford, Mont.	Staff-gage near Stanford.
Musselshell River	Harlowton, Mont.	Chain-gage, at bridge on State Highway No. 19, 1 mile southwest of Harlowton.
Musselshell River	Ryegate, Mont.	Water-stage recorder, 1 mile upstream from mouth of Careless Creek, and 3 miles east of Ryegate.
Musselshell River	Roundup, Mont.	Water-stage recorder, at highway bridge 400 feet upstream from U.S. Highway No. 87, $2\frac{1}{2}$ miles west of Roundup.
Musselshell River	Musselshell, Mont.	Water-stage recorder at Musselshell.
Musselshell River	Mosby, Mont.	Wire-weight gage, at highway bridge, State Highway No. 18, $\frac{1}{2}$ mile west of Mosby.



Stream	Station	Location and Description
American Fork	Harlowton, Mont.	Water-stage recorder, 5 miles southeast of Harlowton, 2 miles upstream from mouth. Below Lebo Creek.
North Fork of Musselshell River	Delpine, Mont.	Water-stage recorder, 500 feet downstream from Lion Creek, $\frac{1}{2}$ mile upstream from flow line of Durand Reservoir.
South Fork of Musselshell River	Martinsdale, Mont.	Water-stage recorder, 3 miles west of Martinsdale, 2 miles downstream from Cottonwood Creek.
Flatwillow Creek	Flatwillow, Mont.	Wire-weight gage on Zimmerman Ranch, 12 miles upstream from Flatwillow.
Flatwillow Creek	Winnett, Mont.	Water-stage recorder, $8\frac{1}{2}$ miles southeast of Winnett.
Dry Creek	Van Norman, Mont.	Water-stage recorder in NW $\frac{1}{4}$ Sec. 3, T18N, R42E, 1.2 miles southeast of Van Norman.
Milk River	Eastern Crossing	Water-stage recorder at eastern crossing of International Boundary just downstream from Canada Coulee, 30 miles north of Rudyard.
Milk River	Lohman, Mont.	Water-stage recorder, $\frac{1}{4}$ mile downstream from Fort Belknap Dam and three-fourths mile north of Lohman.
Milk River	Milk River, Alberta	Water-stage recorder.
Milk River	Glasgow, Mont.	Wire-weight gage, on Glasgow-Fort Peck highway bridge.
Milk River	Nashua, Mont.	Water-stage recorder and wire-weight gage, on Nashua-Fort Peck highway bridge.
North Fork of Milk River	Browning, Mont.	Water-stage recorder, 3 miles south of International Boundary, 30 miles north of Browning, $1\frac{1}{2}$ miles upstream from Canal Outlet.



Stream	Station	Location and Description
North Fork of Milk River	International Border	Water-stage recorder, 2 miles north of International Border and 18 miles east of Kimball, Alberta.
South Fork of Milk River	International Boundary	Water-stage recorder, 1 mile north of International Boundary 20 miles west of Milk River, Alberta.
Lodge Creek	International Boundary	Water-stage recorder in Saskatchewan, 1 mile north of International Boundary, 30 miles north of Havre.
North Chinook Canal	Havre, Mont.	Water-stage recorder in SE $\frac{1}{4}$ Sec. 2, T35N, R17E, 23 miles north-east of Havre.
McRae Coulee	International Boundary	Water-stage recorder in NW $\frac{1}{4}$ Sec. 5, T1N, R28W, 3/4 mile north of boundary.
Battle Creek	International Boundary	Water-stage recorder, in Saskatchewan, $\frac{1}{2}$ mile upstream from International Boundary, 35 miles north of Chinook, Montana.
Battle Creek	International Boundary	Water-stage recorder, above Cypress Lake West Inflow Canal near West Plains, Saskatchewan.
Beaver Creek	International Boundary	Staff gage, at International Boundary.
Matheson Canal	Chinook, Mont.	Water-stage recorder in NW $\frac{1}{4}$ Sec. 29, T33N, R20E, 3 $\frac{1}{2}$ miles east of Chinook.
Woodpile Coulee	International Boundary	Water-stage recorder, 1.1 miles south of boundary, 7 miles upstream from mouth, just downstream from Antelope Coulee.
East Fork of Battle Creek	International Boundary	Water-stage recorder, 27 miles north of Chinook - 2 miles south of International Boundary, 6 miles from Lyons Coulee.
Lyons Coulee	International Boundary	Staff-gage, 8 miles south of Arena, Saskatchewan, $\frac{1}{2}$ mile north of International Boundary.



Stream	Station	Location and Description
Peoples Creek	Dodson, Mont.	Water-stage recorder, near Dodson.
Whitewater Creek	International Boundary	Water-stage recorder, just downstream from North Fork, $3\frac{1}{2}$ miles south of International Boundary, 5 miles northeast of Lowrane, Mont.
Frenchman River	International Boundary	Water-stage recorder, at International Boundary.
Frenchman Canal	Saco, Mont.	Water-stage recorder, 11 miles east of Saco.
Rock Creek	International Boundary	Water-stage recorder, $\frac{3}{4}$ mile south of International Boundary, 5 miles west of Barnard, Mont.
Horse Creek	International Boundary	Water-stage recorder, $\frac{3}{4}$ mile south of International Boundary, $1\frac{1}{2}$ miles upstream from mouth.
McEachern Creek	International Boundary	Wire-weight gage, $\frac{1}{2}$ mile south of International Boundary and 7 miles north of Thoeny, Mont.
Big Sandy Creek	Assinniboine, Mont.	Water-stage recorder, SW $\frac{1}{4}$ Sec. 18, T32N, R15E and 2 miles west of Assinniboine.
Big Sandy Creek	Big Sandy, Mont.	Water-stage recorder, SE $\frac{1}{4}$ Sec. 29, T28N, R13E and $2\frac{1}{2}$ miles southeast of Big Sandy.
Sage Creek	International Boundary	Water-stage recorder, northwest of Havre, Mont.
Sage Creek	Kremlin, Mont.	Water-stage recorder, 8 miles south of Kremlin.
Wolf Creek	Wolf Point, Mont.	Water-stage recorder near Wolf Point.
Redwater Creek	Circle, Mont.	Water-stage recorder at Circle in NE $\frac{1}{4}$ Sec. 15, T19N, R48E.



Stream	Station	Location and Description
East Fork of Poplar River	International Boundary	Water-stage recorder, 16 miles north of Scobey.
Middle Fork of Poplar River	International Boundary	Water-stage recorder, $\frac{1}{2}$ mile south of International Boundary, 20 miles northwest of Scobey, Mont.
Poplar River	Poplar, Mont.	Water-stage recorder, 4 miles north of Poplar.
West Fork Poplar River	International Boundary	Water-stage recorder, 11 miles north, $\frac{3}{4}$ mile east of Ophism, Mont. at West Poplar River Canadian Customs Post at boundary.
Big Muddy Creek	International Boundary	Staff-gage.
Big Muddy Creek	Daleview, Mont.	Water-stage recorder, $\frac{1}{2}$ mile west of Daleview.
Big Muddy Creek	Plentywood, Mont.	Water-stage recorder, near Plentywood.
Big Muddy Creek	Reserve, Mont.	Wire-weight gage at Reserve.
Beaver Creek	International Boundary	Staff-gage, at International Boundary.
Yellowstone River	Yellowstone Lake Outlet, Y.N.P.	Water-stage recorder, 550 feet downstream from Fishing Bridge and 1 mile downstream from outlet of Yellowstone Lake. Yellowstone Nat'l. Park.
Yellowstone River	Canyon Hotel, Wyo.	Water-stage recorder, $\frac{1}{2}$ mile upstream from Upper Falls and Canyon ranger station and $1\frac{1}{4}$ miles south of Canyon Hotel.
Yellowstone River	Corwin Springs, Mont.	Water-stage recorder, at highway bridge at Corwin Springs, 8 miles northwest of Gardiner, Mont.
Yellowstone River	Livingston, Mont.	Water-stage recorder, at U.S. Highway 89 bridge 5 miles south of Livingston.



Stream	Station	Location and Description
Yellowstone River	Billings, Mont.	Water-stage recorder at U.S. Highway 87 bridge, 1 mile northeast of Billings.
Yellowstone River	Miles City, Mont.	Water-stage recorder, at State Highway 22 bridge, 1 mile north of Miles City and 1 mile downstream from Tongue River.
Yellowstone River	Sidney, Mont.	Water-stage recorder, at highway bridge 2 miles south of Sidney, and 30 miles upstream from mouth.
Lamar River	Tower Falls Ranger Station, Wyo.	Water-stage recorder, $\frac{1}{2}$ mile north of Cooke City road, $\frac{3}{4}$ mile upstream from mouth and 2 miles northeast of Tower Falls Ranger Station, Yellowstone Nat'l. Park.
Gardiner River	Mammoth Hot Springs, Y.N.P.	Water-stage recorder, on Wyoming-Montana State Line, about 400 feet upstream from highway bridge, $1\frac{1}{2}$ miles north of Mammoth Hot Springs, Yellowstone Nat'l. Park.
Mill Creek	Pray, Mont.	Staff gage, near Pray.
Shields River	Wilsall, Mont.	Staff gage, 11 miles northeast of Wilsall, 12 miles upstream from Flathead Creek.
Shields River	Clyde Park, Mont.	Water-stage recorder, at highway bridge, $\frac{3}{4}$ mile west of Clyde Park.
Brackett Creek	Clyde Park, Mont.	Staff gage, 4 miles southwest of Clyde Park, 4 miles upstream from the mouth.
Boulder River	Contact, Mont.	Staff gage at Contact.
Boulder River	Big Timber, Mont.	Water-stage recorder, 1 mile east of Big Timber.
Sweetgrass Creek	Melville, Mont.	Water-stage recorder, 9 miles northwest of Melville.



Stream	Station	Location and Description
Sweetgrass Creek	Melville, Mont.	Water-stage recorder, S $\frac{1}{2}$ Sec. 27, T4N, R15E, 6 miles southeast of Melville.
Stillwater River	Absarokee, Mont.	Water-stage recorder, 3 miles downstream from Rosebud Creek, 4 miles northeast of Absarokee and 10 miles southwest of Columbus.
Rosebud Creek	Absarokee, Mont.	Water-stage recorder, at Smith Bridge, $\frac{1}{2}$ mile downstream from confluence of East and West Rosebud Creeks and 2 miles south of Absarokee.
Clarks Fork	Chance, Mont.	Water-stage recorder, at highway bridge at Chance, $\frac{1}{2}$ mile north of Wyoming-Montana State Line.
Clarks Fork	Edgar, Mont.	Wire-weight gage, on highway bridge $\frac{1}{2}$ mile east of Edgar.
Clarks Fork	Painter, Wyo.	Water-stage recorder, above Squaw Creek 12 miles northwest of Painter.
Clarks Fork	Painter, Wyo.	Water-stage recorder, below Crandall Creek near Painter.
Sunlight Creek	Painter, Wyo.	Water-stage recorder, 3 miles west of Painter.
Rock Creek	Red Lodge, Mont.	Water-stage recorder, at bridge 3 miles upstream from West Fork and 4 miles southwest of Red Lodge.
Rock Creek	Joliet, Mont.	Water-stage recorder, NW $\frac{1}{4}$ Sec. 22, T4S, R22E at Joliet.
West Fork of Rock Creek	Red Lodge, Mont.	Water-stage recorder, 6 miles west of Red Lodge, below Basin Creek.
Red Lodge Creek	Boyd, Mont.	Water-stage recorder, just upstream from Cooney Reservoir, 9 miles west of Boyd.
Red Lodge Creek	Boyd, Mont.	Water-stage recorder, $\frac{1}{2}$ mile downstream from Cooney Reservoir.



Stream	Station	Location and Description
Willow Creek	Boyd, Mont.	Water-stage recorder, just upstream from Cooney Reservoir, 8 miles east of Boyd.
Pryor Creek	Billings, Mont.	Wire-weight gage, at bridge on U.S. Highway 87, 11 miles south-east of Billings.
Wind River	Dubois, Wyo.	Water-stage recorder, 7 miles northwest of Dubois.
Wind River	Burris, Wyo.	Water-stage recorder, 5 miles northwest of Burris.
Wind River	Crowheart, Wyo.	Water-stage recorder, 10 miles southeast of Crowheart.
Wind River	Riverton, Wyo.	Water-stage recorder, 3/4 mile southeast of Riverton.
Fivemile Creek	Pavillion, Wyo.	Water-stage recorder.
Fivemile Creek	Shoshoni, Wyo.	Water-stage recorder.
Ocean Drain	Ocean Lake Outlet, Wyo	Water-stage recorder at Ocean Lake Outlet near Pavillion, NW $\frac{1}{4}$ Sec. 31, T3N, R3E.
Poison Creek	Shoshoni, Wyo.	Water-stage recorder, near Shoshoni, NE $\frac{1}{4}$ Sec. 29, T38N, R94W.
Ocean Drain	Pavillion, Wyo.	Water-stage recorder near Pavillion, SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 25, T3N, R3E.
Sand Gulch	Shoshoni, Wyo.	Water-stage recorder near Shoshoni, NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 32, T3N, R5E.
Muddy Creek	Shoshoni, Wyo.	Water-stage recorder, NW Sec. 34, T4N, R5E.
Muddy Creek	Pavillion, Wyo.	Gage near Pavillion, NW $\frac{1}{4}$ Sec. 35, T5N, R2E.
Muddy Creek	Pavillion, Wyo.	Water-stage recorder.



Stream	Station	Location and Description
Bighorn River	Boysen Dam, Wyo.	Water-stage recorder below Boysen Dam, SW $\frac{1}{4}$ Sec. 9, T5N, R6W.
Bighorn River	Thermopolis, Wyo.	Water-stage recorder, at Thermopolis, $\frac{1}{2}$ mile downstream from highway bridge between Thermopolis and hot springs.
Bighorn River	Manderson, Wyo.	Wire-weight gage, Sec. 28, T49N, R42W.
Bighorn River	Kane, Wyo.	Water-stage recorder, $\frac{1}{2}$ mile east of Kane.
Bighorn River	St. Xavier, Mont.	Water-stage recorder, 50 feet upstream from diversion dam of Bighorn irrigation canal of Crow Agency, 15 $\frac{1}{2}$ miles southwest of St. Xavier.
Bighorn Canal	St. Xavier, Mont.	Water-stage recorder, 13 $\frac{1}{2}$ miles southwest of St. Xavier.
Bighorn River	Custer, Mont.	Water-stage recorder, 3 miles upstream from Tullock Creek, 4 miles southeast of Custer, and 4 $\frac{1}{2}$ miles upstream from mouth.
North Fork Wind River	Dubois, Wyo.	Gage near Dubois, NW $\frac{1}{4}$ Sec. 34, T6N, R6W.
Dinwoody Creek	Burris, Wyo.	Gage near Burris, NW $\frac{1}{4}$ Sec. 10, T5N, R5W.
Bull Lake Creek	Above Bull Lake Reservoir, Wyo.	Water-stage recorder, $\frac{3}{4}$ mile upstream from high-water line of Bull Lake Reservoir and 11 miles south of Lenore.
Bull Lake Creek	Lenore, Wyo.	Water-stage recorder, 2 $\frac{1}{2}$ miles downstream from Bull Lake Reservoir and 14 miles southeast of Lenore.
Wyoming Canal	Lenore, Wyo.	Gage near Lenore, NW $\frac{1}{4}$ Sec. 24, T3N, R2W.
Wyoming Canal	Morton, Wyo.	Gage near Morton, below Pilot Butte Diversion, NW $\frac{1}{4}$ Sec. 20, T3N, R1E.



Stream	Station	Location and Description
Pilot Canal	Morton, Wyo.	Gage near Morton, NW $\frac{1}{4}$ Sec. 34, T3N, R1E.
Pilot Wasteway	Morton, Wyo.	Gage near Morton, NE $\frac{1}{4}$ Sec. 33, T3N, R1E.
Popo Agie River	Riverton, Wyo.	Water-stage recorder, 1 $\frac{1}{4}$ miles upstream from mouth and 2 miles southeast of Riverton.
North Popo Agie River	Lander, Wyo.	Water-stage recorder, 4 $\frac{1}{2}$ miles northeast of Lander.
North Popo Agie River	Milford, Wyo.	Water-stage recorder, 4 miles west of Milford.
Little Popo Agie river	Hudson, Wyo.	Chain gage, at Hudson, $\frac{1}{2}$ mile upstream from mouth.
Little Popo Agie River	Lander, Wyo.	Water-stage recorder, 10 miles south of Lander.
Little Wind River	Arapahoe, Wyo.	Gage near Arapahoe, on line between Sec. 13 and 14, T1S, R2E.
Beaver Creek	Arapahoe, Wyo.	Gage near Arapahoe, on line between Sec. 20 and 29, T1S, R4E.
Kirley Draw	Riverton, Wyo.	Gage near Riverton, Sec. 3, T1N, R5E.
Muskrat Creek	Shoshoni, Wyo.	Gage near Shoshoni, Sec. 15, T2N, R6E.
Fivemile Creek	Pavillion, Wyo.	Gage near Pavillion, NW $\frac{1}{4}$ Sec. 25, T4N, R1E.
Fivemile Creek	Riverton, Wyo.	Gage near Riverton, SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 27, T3N, R4E.
Fivemile Creek	Shoshoni, Wyo.	Gage near Shoshoni, SE $\frac{1}{4}$ Sec. 19, T3N, R6E.



Stream	Station	Location and Description
Dry Cottonwood Creek	Bonneville, Wyo.	Water-stage recorder, near Bonneville, Sec. 1, T4N, R5E.
Badwater Creek	Lost Cabin, Wyo.	Water-stage recorder at Lybyer Ranch near Lost Cabin, NE $\frac{1}{4}$ Sec. 18, T39N, R89W.
Badwater Creek	Bonneville, Wyo.	Water-stage recorder at Bonneville.
South Fork Owl Creek	Thermopolis, Wyo.	Water-stage recorder, 1.7 miles southwest of Curtis Ranch and 30 miles northwest of Thermopolis.
Gooseberry Creek	Pulliam, Wyo.	Water-stage recorder, 1/4 of a mile north of Pulliam.
Gooseberry Creek	Grass Creek, Wyo.	Water-stage recorder, 4 $\frac{1}{2}$ miles northwest of Grass Creek.
Fifteenmile Creek	Worland, Wyo.	Gage near Worland, NE $\frac{1}{4}$ Sec 27, T47N, R93W.
Owl Creek	Thermopolis, Wyo.	Water-stage recorder, at McCumber Ranch, 6 miles northwest of Thermopolis.
Owl Creek	Lucerne, Wyo.	Chain and staff gages, 1 mile upstream from mouth and 2 miles south of Lucerne.
North Fork Owl Creek	Anchor, Wyo.	Water-stage recorder, 4 $\frac{1}{2}$ miles west of Anchor.
Nowood Creek	Tensleep, Wyo.	Gage near Tensleep, Sec. 27, T47N, R88W.
Tensleep Creek	Tensleep, Wyo.	Water-stage recorder, 4 $\frac{1}{2}$ miles northeast of Tensleep.
Paintrock Creek	Hyattville, Wyo.	Water-stage recorder, 6 miles northeast of Hyattville.
Paintrock Creek	Hyattville, Wyo.	Water-stage recorder, below Lake Solitude and 18 miles northeast of Hyattville.



Stream	Station	Location and Description
Medicine Lodge Creek	Hyattville, Wyo.	Water-stage recorder, $4\frac{1}{2}$ miles northeast of Hyattville.
Greybull River	Pitchfork, Wyo.	Water-stage recorder, 4 miles west of Pitchfork.
Greybull River	Meeteetse, Wyo.	Water-stage recorder at Meeteetse.
Greybull River	Basin, Wyo.	Water-stage recorder, Sec. 17, T51 N, R94W, 8 miles west of Basin.
Wood River	Sunshine, Wyo.	Water-stage recorder, $\frac{1}{2}$ of a mile east of Sunshine.
Shell Creek	Shell, Wyo.	Water-stage recorder, 5 miles northeast of Shell.
Dry Creek	Greybull, Wyo.	Gage at Greybull, Sec. 6, T52N, R93W.
Shoshone River	Buffalo Bill Reservoir, Wyo.	Water-stage recorder, 3 miles downstream from Buffalo Bill Reservoir and $3\frac{1}{2}$ miles west of Cody.
Shoshone River	Byron, Wyo.	Water-stage recorder, at Byron.
Bitter Creek	Garland, Wyo.	Gage near Garland, SW $\frac{1}{4}$ Sec. 7, T55N, R97W.
Sage Creek	Lovell, Wyo.	Gage near Lovell, Sec. 8, T56N, R96W.
Soap Creek	St. Xavier, Mont.	Water-stage recorder, 6 mile upstream from mouth and 10 miles southwest of St. Xavier.
Little Bighorn River	Wyola, Mont.	Water-stage recorder, $\frac{1}{2}$ mile north of Montana-Wyoming State Line, 13 miles southwest of Wyola.
Little Bighorn River	Wyola, Mont.	Water-stage recorder, 2.75 miles downstream from Pass Creek, and 3.5 miles north of Wyola.
Little Bighorn River	Crow Agency, Mont.	Water-stage recorder at C.B.&Q.R.R. bridge, 2 miles south of Crow Agency.



Stream	Station	Location and Description
Pass Creek	Wyola, Mont.	Water-stage recorder, 5 miles south of Wyola.
Lodge Grass Creek	Wyola, Mont.	Water-stage recorder, 10 miles west of Wyola, $1\frac{1}{2}$ miles downstream from Spring Creek, $\frac{1}{2}$ mile upstream from Willow Creek Diversion Canal.
South Fork Tongue River	Dayton, Wyo.	Water-stage recorder, 12 miles southwest of Dayton.
North Fork Tongue River	Dayton, Wyo.	Water-stage recorder, $19\frac{1}{2}$ miles southwest of Dayton.
Tongue River	Dayton, Wyo.	Water-stage recorder, $3\frac{1}{2}$ miles southwest of Dayton.
Tongue River	Acme, Wyo.	Water-stage recorder, 3.2 miles northeast of Acme.
Tongue River	Decker, Mont.	Water-stage recorder, $\frac{1}{2}$ mile downstream from Tongue River Reservoir, 7 miles northeast of Decker.
Tongue River	Miles City, Mont.	Water-stage recorder, 4 miles south of Miles City.
Wolf Creek	Wolf, Wyo.	Water-stage recorder, at Wolf, $\frac{1}{2}$ mile downstream from Red Canyon Creek.
Goose Creek	Sheridan, Wyo.	Water-stage recorder, 14 miles southeast of Sheridan.
Goose Creek	Sheridan, Wyo.	Wire-weight gage, 0.4 mile north of Sheridan City Limits.
Little Goose Creek	Big Horn, Wyo.	Water-stage recorder, 300 feet upstream from head gate of Lower Peralta ditch and 7 miles southwest of Big Horn.
Rosebud Creek	Forsyth, Mont.	Water-stage recorder, 10 miles southeast of Forsyth and 5 miles upstream from mouth.



Stream	Station	Location and Description
Powder River	Arvada, Wyo.	Water-stage recorder at Arvada.
Powder River	Moorhead, Mont.	Water-stage recorder at Moorhead.
Powder River	Locate, Mont.	Water-stage recorder, at bridge on U.S. Highway 12, 5 miles west of former site of Locate, and 25 miles east of Miles City.
Middle Fork of Powder River	Kaycee, Wyo.	Water-stage recorder, at Jay Bar U Ranch, 6 miles east of Kaycee, $1\frac{1}{2}$ miles downstream from North Fork Powder River.
North Fork of Powder River	Mayoworth, Wyo.	Water-stage recorder, 1 mile downstream from mouth of canyon and 8 miles northwest of Mayoworth.
North Fork of Powder River	Hazleton, Wyo.	Water-stage recorder, 7.5 miles southwest of Hazleton.
North Fork Crazy Woman Creek	Buffalo, Wyo.	Water-stage recorder, 13 miles southwest of Buffalo.
Middle Fork Crazy Woman Creek	Greub, Wyo.	Water-stage recorder, $2\frac{1}{2}$ miles west of Greub.
Clear Creek	Buffalo, Wyo.	Water-stage recorder, at mouth of canyon, 500 feet upstream from Mountain States Power Co. Power Plant, and 4 miles west of Buffalo.
Clear Creek	Arvada, Wyo.	Chain gage, $1\frac{1}{2}$ miles upstream from mouth and 16 miles north of Arvada.
North Fork Clear Cr.	Buffalo, Wyo.	Water-stage recorder, near Buffalo.
Little Powder River	Broadus, Mont.	Water-stage recorder, $5\frac{1}{2}$ miles southeast of Broadus.
Rock Creek	Buffalo, Wyo.	Water-stage recorder, 300 feet below confluence of North and South Forks and 11.5 miles northwest of Buffalo.



Stream	Station	Location and Description
Rock Creek	Arlington, Wyo.	Water-stage recorder.
Piney Creek	Kearney, Wyo.	Water-stage recorder, 1000 feet south of Kearney.
South Piney Creek	Willow Park, Wyo.	Water-stage recorder, 11 miles southwest of Story.
Grand River	Shadehill, S. Dak.	Water-stage recorder, on bridge on State Highway 73 at Shadehill.
North Fork Grand R.	White Butte, S. Dak.	Water-stage recorder, 9 $\frac{3}{4}$ miles south of White Butte.
Grand River	Wakpala, S. Dak.	Water-stage recorder, at bridge on U.S. Highway 12, 5 miles west of Wakpala.
South Fork Grand R.	Cash, S. Dak.	Water-stage recorder, 4 miles north of Cash.
Moreau River	Faith, S. Dak.	Wire-weight gage, 13 $\frac{1}{2}$ miles northwest of Faith.
Moreau River	Eagle Butte, S. Dak.	Water-stage recorder, 13 miles north of Eagle Butte.
Moreau River	Promise, S. Dak.	Water-stage recorder at county highway bridge, $\frac{3}{4}$ mile north of Promise.
Moreau River	Bixby, S. Dak.	Water-stage recorder, at County highway bridge, $\frac{1}{4}$ mile east of Bixby.
Cheyenne River	Edgemont, S. Dak.	Water-stage recorder, at Edgemont.
Cheyenne River	Hot Springs, S. Dak.	Wire-weight gage, at bridge on State Highway 87, 10 miles southwest of Hot Springs.
Cheyenne River	Eagle Butte, S. Dak.	Water-stage recorder, at bridge on State Highway 63, 21 miles south of Eagle Butte.



Stream	Station	Location and Description
Cheyenne River	Plainview, S. Dak.	Wire-weight gage near Plainview.
Cheyenne River	Wasta, S. Dak.	Water-stage recorder at bridge on U.S. Highway 16, 3 miles east of Wasta.
Cheyenne River	Angostura Dam, S. Dak.	Water-stage recorder, below Angostura Dam and 5 miles southeast of Hot Springs.
Fall River	Hot Springs, S. Dak.	Water-stage recorder, at Seventh Street Bridge in city of Hot Springs.
Beaver Creek	Buffalo Gap, S. Dak.	Water-stage recorder, $1\frac{1}{2}$ miles south of Buffalo Gap and $4\frac{1}{2}$ miles upstream from mouth.
Beaver Creek	Newcastle, Wyo.	Water-stage recorder.
Rapid Creek	Pactola, S. Dak.	Water-stage recorder, $3/4$ of a mile northwest of Pactola.
Rapid Creek	Rapid City, S. Dak.	Water-stage recorder, above Canyon Lake, 5 miles southwest of Rapid City.
Rapid Creek	Rapid City, S. Dak.	Water-stage recorder, at Rapid City, 200 feet downstream from Oshkosh Street Bridge and 3.7 miles downstream from Canyon Lake.
Rapid Creek	Rapid City, S. Dak.	Water-stage recorder, below Hawthorn ditch and 2 miles southeast of Rapid City.
Rapid Creek	Rapid City, S. Dak.	Water-stage recorder, below Little Giant ditch, near Rapid City.
Rapid Creek	Caputa, S. Dak.	Water-stage recorder, $3/4$ of a mile southwest of Caputa.
Rapid Creek	Farmingdale, S. Dak.	Water-stage recorder, at county highway bridge, 2 miles southeast of Farmingdale.



Stream	Station	Location and Description
Bennett Ditch	Rapid City, S. Dak.	Water-stage recorder.
Cyclone Ditch	Rapid City, S. Dak.	Water-stage recorder, near Rapid City.
Iowa Ditch	Rapid City, S. Dak.	Water-stage recorder, near Rapid City.
Leedy Ditch	Rapid City, S. Dak.	Water-stage recorder.
Lockhart Ditch	Rapid City, S. Dak.	Water-stage recorder.
Lone Tree Ditch	Rapid City, S. Dak.	Water-stage recorder.
Murphy Ditch	Rapid City, S. Dak.	Water-stage recorder.
South Side Ditch	Rapid City, S. Dak.	Water-stage recorder.
Castle Creek	Deerfield, S. Dak.	Water-stage recorder above Deerfield Reservoir.
Castle Creek	Deerfield Res. S. Dak.	Stages only.
Castle Creek	Deerfield, S. Dak.	Water-stage recorder, below Deerfield Reservoir and $1\frac{1}{4}$ miles northeast of Deerfield.
Lance Creek	Spencer, Wyo.	Water-stage recorder, near Spencer, Wyo.
Belle Fourche River	Moorcroft, Wyo.	Water-stage recorder, $5\frac{1}{2}$ miles northeast of Moorcroft.
Belle Fourche River	Hulett, Wyo.	Wire-weight gage, at Hulett, 2 miles downstream from Blacktail Creek.
Belle Fourche River	Wyo.-S. Dak. State Line	Water-stage recorder, 11 miles northwest of Belle Fourche.



Stream	Station	Location and Description
Belle Fourche River	Fruitdale, S. Dak.	Water-stage recorder, $2\frac{1}{2}$ miles northwest of Fruitdale at bridge on U.S. Highway 212.
Belle Fourche River	Sturgis, S. Dak.	Water-stage recorder, 20 miles northeast of Sturgis at bridge on State Highway No. 24.
Belle Fourche River	Elm Springs, S. Dak.	Water-stage recorder, at county highway bridge 6 miles north of Elm Springs.
Inlet Canal	Belle Fourche, S. Dak.	Water-stage recorder.
Spearfish Creek	Spearfish, S. Dak.	Water-stage recorder at Spearfish.
Bear Butte Creek	Sturgis, S. Dak.	Wire-weight gage, 12 $\frac{3}{4}$ miles northeast of Sturgis.
Cherry Creek	Plainview, S. Dak.	Water-stage recorder, at bridge on State Highway 73, 11 miles northeast of Plainview.
Battle Creek	Hermosa, S. Dak.	Wire-weight gage.
Elk Creek	Elm Springs, S. Dak.	Wire-weight gage.
Spring Creek	Hermosa, S. Dak.	Staff gage, near Hermosa.
Battle Creek	Hermosa, S. Dak.	Wire-weight gage, below Hermosa.
Hat Creek	Edgemont, S. Dak.	Wire-weight gage, near Edgemont.
Redwater River	Belle Fourche, S. Dak.	Water-stage recorder at Belle Fourche, $\frac{1}{2}$ mile upstream from mouth.



APPENDIX H

OPERATION OF FORT PECK DAM DURING FLOODS

1. General. Fort Peck Dam will be operated during flood periods to reduce high river stages on the Missouri River below Fort Peck. After receiving the prior approval of the District Engineer the operations will progress through the following stages as the flood danger increases downstream from Fort Peck Dam. Specific approval of the District Engineer will be obtained for each reduction in discharge below that needed for the normal operation of the power plant.

- a. Reservoir Regulation. During periods of high river stages on the Missouri River below Fort Peck with predicted stages approaching flood stage the tunnel and spillway discharges from the Fort Peck Reservoir will be progressively reduced as the flood danger increases to the amount required for operation of the Fort Peck Power Plant.
- b. Milk River. If flooding should occur on the Milk River near its confluence with the Missouri River with resultant danger to life and property the discharge from the Fort Peck Reservoir will be reduced as directed by the District Engineer. A minimum discharge sufficient for requirements of the Fort Peck Power Plant will be maintained.



APPENDIX I

EMPLOYMENT OF HIRED LABOR

In those cases of extreme emergency such as floods or other disaster conditions, which occur in the Fort Peck District, and when operation of the District Emergency Flood Plan becomes necessary, requiring the emergency employment of Force Account personnel for periods not to exceed one month in connection with hired labor operations, the employee in charge of field operations will be responsible for employing necessary personnel locally and such employments will be made at hourly rates. The rates of pay will be determined after considering local conditions and predetermined rates which may have been approved for the particular vicinity. Data concerning Department of Labor predetermined rates should be obtained from the Fort Peck District Office. In the absence of predetermined local wage rates, prevailing rates in the locality should be paid. Information concerning such rates may be obtained from the nearest State Employment Service Office and/or private employers in the area.

The only form required in connection with this type of emergency or excepted employment is DD Form 300, "Temporary Employment Application and Appointment Affidavits". This form will be completed in accordance with instructions given on the form and according to the sample (Plate I-1). If the position for which the appointee is being employed is for Laborer, the statement "Excepted Appt, Sched A, Sec 6.101(o), NTE 1 Month" will be typed in item 20 on the form, or if the position is other than for Laborer, the statement "Temp Appt, GS Reg 2.114(c) NTE 1 Month" should be typed in item 20 on the form.

In order to utilize this simplified procedure for appointment, specific District employees will be delegated appointing authority as required under the provisions of paragraph 3210.02 O&R, and the authority to administer oaths in accordance with War Department Orders C of 1946 as amended by Orders E of 1946. Sample of the above delegation is included in this Appendix as Plate I-2.



TEMPORARY EMPLOYMENT APPLICATION AND APPOINTMENT AFFIDAVITS

Budget Bureau No. 22-R035
Approval Expires 31 Aug 1952

NOTE: This application is to be used only for short-term temporary employment in positions not subject to investigation under the Federal Employees Loyalty Program, and where it is not required that education and experience be shown on the application.

1. NAME OF APPOINTEE (Print or Type Full Name) John O. Hanson			2. PRESENT ADDRESS (No. & Street, City & State) 1519 SE 6th Street, Miles City, Mont.		3. DATE OF APPLICATION 7 June 1951
4. TELEPHONE NUMBER 156-J	5. DATE OF BIRTH 5-23-1901	6. SEX <input checked="" type="checkbox"/> MALE <input type="checkbox"/> FEM.	7. ARE YOU A CITIZEN OF OR DO YOU OWE ALLEGIANCE TO THE UNITED STATES? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
8a. IN CASE OF EMERGENCY PLEASE NOTIFY Mrs. Jane Hanson		8b. RELATIONSHIP Wife	c. ADDRESS (No. & Street, City & State) 1519 SE 6th Street, Miles City, Montana		d. TELEPHONE NO. 156-J

Indicate answer to the following questions by checking the appropriate box.

9. ARE YOU A VETERAN? (If your answer is "Yes", give in Item 17 on reverse the branch of service, dates of service, and service number) <input type="checkbox"/> YES <input type="checkbox"/> NO		13. HAVE YOU EVER BEEN DISCHARGED OR FORCED TO RESIGN, FOR MISCONDUCT OR UNSATISFACTORY SERVICE FROM ANY POSITION? (If your answer is "Yes", give in Item 17 on reverse the name and address of employer, date, and reason in each case). <input type="checkbox"/> YES <input type="checkbox"/> NO	
10. ARE YOU NOW EMPLOYED BY THE FEDERAL GOVERNMENT? (If your answer is "Yes", give in Item 17 on reverse the department and location). <input type="checkbox"/> YES <input type="checkbox"/> NO		14. DO YOU RECEIVE AN ANNUITY FROM THE UNITED STATES OR DISTRICT OF COLUMBIA GOVERNMENT UNDER ANY RETIREMENT ACT OR A PENSION OR OTHER COMPENSATION FOR MILITARY OR NAVAL SERVICE? (If your answer is "Yes", give in Item 17 on reverse the reason for retirement, that is, age, optional, disability or by reason of voluntary or involuntary separation after 5 years' service; amount of retirement pay and under what retirement act; and rating, if retired from military or naval service). <input type="checkbox"/> YES <input type="checkbox"/> NO	
12. HAVE YOU ANY PHYSICAL DEFECT OR DISABILITY WHATSOEVER? (If your answer is "Yes", give complete details in Item 17 on reverse). <input type="checkbox"/> YES <input type="checkbox"/> NO		15. ARE YOU AN OFFICIAL OR EMPLOYEE OF ANY STATE, TERRITORY, COUNTY OR MUNICIPALITY? (If your answer is "Yes", give details in Item 17 on reverse). <input type="checkbox"/> YES <input type="checkbox"/> NO	
11. HAVE YOU BEEN ARRESTED SINCE YOUR 16TH BIRTHDAY? (Do not include traffic violations for which you were fined \$25 or less or forfeited collateral of \$25 or less. If your answer is "Yes", list all such cases in Item 17 on reverse giving in each case (a) the date; (b) the nature of the offense or violation; and (c) the penalty imposed, if any). <input type="checkbox"/> YES <input type="checkbox"/> NO			

16. READ THE APPOINTMENT AFFIDAVITS ON THE REVERSE SIDE (Do not sign until instructed to do so by Appointing Officer). I, THE UNDERSIGNED APPOINTEE, DO SOLEMNLY SWEAR (or affirm) THAT I HAVE READ THE APPOINTMENT AFFIDAVITS ON THE REVERSE SIDE OF THIS FORM, THAT I UNDERSTAND THEIR PROVISIONS AND WILL ABIDE THEREBY. I FURTHER SWEAR (or affirm) THAT THE STATEMENTS MADE AND THE INFORMATION FURNISHED BY ME HEREON ARE TRUE, COMPLETE, AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND ARE MADE IN GOOD FAITH.

John O. Hanson
SIGNATURE OF APPOINTEE

THIS SPACE FOR USE OF APPOINTING OFFICER

18. TITLE OF POSITION Laborer		19. GRADE AND/OR RATE OF PAY \$1.25 per hour	20. TYPE AND DURATION OF APPOINTMENT Excepted Appt, Sched A, Sec 6.101(c), NTE 1 month.
21. DATE OF APPOINTMENT 7 June 1951		22. INSTALLATION Dept of the Army, Corps of Engineers, Ft Peck District	
23. ADDRESS OF INSTALLATION Miles City, Montana		24. ITEM 9 VERIFIED. PREFERENCE ALLOWABLE IS <input type="checkbox"/> 5 PTS. <input type="checkbox"/> 10 PTS. <input checked="" type="checkbox"/> b. APPOINTMENT APPROVED <input checked="" type="checkbox"/>	
c. SUBSCRIBED AND SWORN TO BY ME THIS 7th DAY OF June A.D. 19 51 , AT Miles City, Montana CITY STATE			

d. SIGNATURE OF APPOINTING OFFICER AND/OR OFFICER AUTHORIZED TO ADMINISTER OATH <i>John Doe</i>	e. TITLE Civil Engineer
SECTION 206, ACT OF 26 JUNE 1943	
f. COMMISSION EXPIRES (Only if executed by Notary Public) 7 June 1951	

INSTRUCTIONS TO APPOINTING OFFICER

- When using this form to effect emergency appointments, where no separate appointing instrument will be issued, the appointing officer will complete only Items 1-8 and Item 16. Appointing officer will complete Items 18-25, checking block in Item 24b. Items 24c and e will also be executed if appointing officer is also administering oath.
- When using this form to effect all other short term temporary appointments in positions not subject to investigation under the Federal Employees Loyalty Program, appointee will complete Items 1-17. Appointing officer will complete Items 21-25, checking appropriate block in Item 24a, omitting 24b and/or completing 24c, as applicable. Items 18-20 may be completed if desired.
- The appointing officer must determine to his own satisfaction that this appointment is in conformance with the applicable Civil Service Rules and Regulations.

CORPS OF ENGINEERS, U S. ARMY
Office of the District Engineer
FORT PECK DISTRICT
Fort Peck, Montana

SUBJECT: Delegations of Authority

TO:

Pursuant to authority delegated in War Department Orders C of 1946 as amended by Orders E of 1946 and authority of paragraph 3210.02, O&R, you are hereby authorized to administer Oaths of Office and are granted appointing authority to effect emergency temporary and excepted force account employments as required when you are detailed as Chief of Flood Fighting, Flood Rescue, or other disaster relief party.

R. E. YORK,
Colonel, Corps of Engineers
District Engineer



APPENDIX J

SUPPLY

SUPPLY PLAN: When the District Emergency Flood Plan becomes effective, equipment, supplies and materials will be dispatched promptly from the District Office to the vicinity of the Flood, if practicable, and available, where they will be stored in an orderly manner, reasonably protected and readily accessible for immediate use. In the event airplane service is necessary to effectively observe ice and/or flood conditions it may be obtained by the Chief of Party from the nearest available source in the same manner as Emergency Supplies and Materials. The services of small planes with pilot can ordinarily be obtained for not more than \$10.80 per hour.

EMERGENCY SUPPLIES AND MATERIALS: May be obtained by the Chief of Party by local purchase on Field Order not in excess of \$100.00 for any one transaction or by cash purchase not in excess of \$25.00 for any one transaction.

(a) Field Order Purchase. If time permits, oral quotation should be obtained from two or more dealers and purchase made from low bidder. The Field Order (see sample Plate J-1) will be signed by the Chief of Party and will serve as a receipt to the vendor for items furnished. The duplicate signed order shall be given to the vendor, one copy shall be retained by the Chief of Party and the original and other copies forwarded to the District Office to be used as a basis for issuing the confirming purchase order. The Chief of Party should state on the original copy of the Field Order forwarded to the District Office that "Quotations were obtained from _____ Dealers and purchase was made from the low bidder". The Chief of Party will also furnish the vendor with Invoice forms (see sample Plate J-3) with instructions as to their completion. These forms will be forwarded in triplicate to the District Office by the vendor, as soon as possible, so payment for the items purchased can be made.

(b) Cash Purchase: Cash purchases should be resorted to only in cases where no dealer in the area will accept a Government Field Order. Under such circumstances where cash purchases are made the employee making the purchase and payment must obtain itemized receipt, preferably on "Cash Receipt Form 1012D," or if this form is not available to employee, on the vendors sales ticket or bill of sale. The full signature and address of the vendor shall be secured on the bill of sale. In any event the receipt must be itemized and show the name of the employee who made cash payment. Such receipts must be attached to employee's expense and per diem voucher in support of claim for reimbursement.

The following items are covered by mandatory contracts and should not be procured in the open market except in extreme emergency and only when time will not permit contacting and obtaining authority through the District Office:

Explosive and blasting accessories	
Gasoline and fuel oil: Tank Wagon and drum deliveries	
Tire chains	Office equipment
Automotive Storage batteries	Typewriter, adding machine, etc.
Electric lamps	Office duplicating equipment
Office furniture	Portable drinking fountain
Floor and window coverings	Household furniture
Books	Envelopes
Machine tools	Brushes
Wood working saws	Brooms
Paper drinking cups	Canvas goods
Telephone and parts	*Tires and tubes
Spark Plugs	

*Tires and tubes may be purchased on the open market in cases of extreme emergency, and shall be obtained only after approval of the District Office. Competitive bids should be obtained from at least two dealers.

EMERGENCY LEASE OF PLANT: Where necessary, equipment may be obtained locally at reasonable prices not to exceed \$300.00 by use of a temporary agreement on Field Order form after the solicitation if practicable of at least three (3) bids, the Field Order to be superseded by formal agreement on Engineer Form 17 (1 Nov 1950) (See Plates J-2 and J-5). Field Order should describe the equipment, name, type, serial number, horsepower, etc., show whether rented with or without operating personnel, and whether lessor is to furnish fuel, lubricants, etc., approximate period of rental, rental rate; and should contain a statement that it is rented in accordance with the terms of Engineer Form 17 (1 Nov 1950) and that this temporary agreement will be superseded by formal agreement executed on that form. The party from whom the equipment is rented should be shown on Engineer Form 17 (1 Nov 1950) and his concurrence with the terms and conditions thereof obtained. Concurrence should be substantiated by having the lessor sign the Field Orders also.

TRANSPORTATION OF SUPPLIES, MATERIALS AND EQUIPMENT: Procurements necessitating transportation to the scene of the flood by commercial transportation should be made on an F.O.B. destination basis insofar as possible. However, if the use of Government Bills of Lading is necessary to accomplish transportation, same may be obtained by request therefor by telephone or telegraph to the District Office. If necessary such shipments may be made on commercial Bill of Lading for conversion to Government Bill of Lading at destination; in such cases the original commercial Bill of Lading must be obtained and forwarded to the District Office with the request that it be converted to Government Bill of Lading.

GENERAL: The Chief of Party may obtain any information or assistance required in connection with the Supply Program by telephone or telegraph request therefor to the District Office, attention, The Chief of Supply Branch.

WAR DEPARTMENT
U.S. ENGINEER OFFICE
FORT PECK DISTRICT
FORT PECK, MONTANA

Date 14 January 1944

To A. B. C. Store at Location, N. D.

Please deliver the following articles all charges prepaid to U.S. Engineer Office at Location, N.D. on or before 14 January 1944

Packages should be marked: "Order No. _____" (Stating this order number.)

Charge to account of U.S. ENGINEER OFFICE, FORT PECK, MONTANA. Only articles of growth, production or manufacture of the United States should be furnished under this order. Send bill IN TRIPLICATE, showing this order number, to U.S. ENGINEER OFFICE, FORT PECK, MONTANA.
PLEASE READ ATTACHED INSTRUCTIONS.

QUANTITY	UNIT	ARTICLES	UNIT PRICE
4	No.	Shovels, long handle, rd. point	1.00 Ea.
1	Doz.	Wood Screws 1½ x #12	
1	Sack	Cement	1.04 Sk.
5	Lb.	SD Nails	.10 #
100	BF	1 x 10 x 12 Lumber	48.00 MBF
		or	
10	Pcs.	1 x 10 x 12 Lumber	48.00 MBF
<p>"The following notation is to be shown on the original and all other copies except copy furnished vendor:</p>			
<p>"Quotations were obtained from _____ dealers and purchase was made from low bidder." _____ number</p>			

Richard Roe

Engineer

Order No. _____
(Show order Number on Bill)

PLATE J-1



WAR DEPARTMENT
U.S. ENGINEER OFFICE
FORT PECK DISTRICT
FORT PECK, MONTANA

Date 14 January 1944

To John Doe at Location, N. D.

Please deliver the following articles all charges prepaid to U.S. Engineer Office at Location, N. D. on or before 14 January 1944

Packages should be marked: "Order No. _____" (Stating this order number.) Charge to account of U.S. ENGINEER OFFICE, FORT PECK, MONTANA. Only articles of growth, production, or manufacture of the United States should be furnished under this order. Send bill IN TRIPPLICATE showing this order number, to U.S. ENGINEER OFFICE, FORT PECK, MONTANA.

PLEASE READ ATTACHED INSTRUCTIONS.

QUANTITY	UNIT	ARTICLES	UNIT PRICE	
1	No.	Rental of Caterpillar Tractor.		
		Model D8 serial No. 1H0000, 110 H.P..		
		Motor No. 1H0000, w/power control unit	Basic	Rate
		No. 220000	780.00	per
		From 14 Jan. 44 for approximately ten		month
		days.		
		Above described equipment rented *with or		
		*without operating personnel		
		(*Delete words not applicable)		
		All fuel, lubricants, etc., *will or *will not		
		be furnished by the lessor.		
		(*Delete words not applicable)		
		In accordance with the terms and conditions		
		of W.D. Form 17 (Engineers) which will be		
		executed to supersede this temporary agreement.		
		AGREED TO:		

John Doe
Lessor-Owner

For the District Engineer:

By: Richard Roe

Chief of Party

Order No. _____
(Show Order Number on Bill)

PLATE J-2



I N V O I C E
(Submit in Triplicate)

Firm Name

Address

Purchase Order No. _____

Date _____

TO: Corps of Engineers
Fort Peck District
Fort Peck, Montana

Delivery made to: _____

<u>Quantity</u>	<u>Articles</u>	<u>Unit Price</u>	<u>Total Cost</u>
-----------------	-----------------	-----------------------	-----------------------

I certify that the above bill is correct and just and that payment therefor has not been received.

Firm Name-Exactly as on Invoice Head

By _____

Title _____



CORPS OF ENGINEERS, U. S. ARMY
Office of the District Engineer
FORT PECK DISTRICT
Fort Peck, Montana

14 April 1950

CIRCULAR LETTER NO. 1337

SUBJECT: Use of Airplanes

TO: All Concerned

1. The following regulations shall govern in all cases in the future where services or rental of airplanes are required in connection with performance of official duties.

2. When service of an airplane in the vicinity of Fort Peck is required the Division or Independent Branch Chief concerned shall submit a requisition to the Supply Branch. The requisition shall state the route over which travel is desired, the approximate time the airplane will be required, the charge applicable thereto and type of airplane required to accommodate personnel assigned to the work and will specify "with pilot" unless cogent reasons exist for using an employee as pilot.

3. On receipt of the requisition the Supply Branch will make the necessary arrangements for services of airplane with pilot whenever possible.

4. In the event that service of an airplane with pilot is not available, the Supply Branch will arrange for an airplane without pilot. The requisitioning branch will be informed immediately by the Supply Branch of the condition. The head of the requisitioning branch will be responsible for informing the Chief of the Personnel Branch of the need for a pilot. A pilot will be assigned from qualified personnel within the District Office by the Chief of the Personnel Branch.

5. In the case of employees traveling in the field away from Fort Peck where the services of an airplane are essential to the accomplishment of the mission, such services may be obtained by the employee. It is desired that services of airplanes with pilot be obtained in all cases except where cogent reasons exist that an employee fly the airplane. In such cases only those employees who have been specifically delegated authority to fly the airplane on official business either by notation on the travel order or detail through the Personnel Branch, are authorized to hire plane without pilot. In all cases a release will be obtained from the owner and placed in safekeeping prior to time flight is made. Release form may be obtained from the Supply Branch.

6. Planes owned by employees of the District will not be rented.

/s/ Edward J. Gallagher
EDWARD J. GALLAGHER
Lt Col, Corps of Engineers
Acting District Engineer



Date _____

The District Engineer
Corps of Engineers
U S. Army
Fort Peck District
Fort Peck, Montana

Dear Sir:

The undersigned, owner of airplane rented to the Government under Purchase Order No. _____, hereby agrees to release the United States and its officers and agents from all responsibility for damages such as are ordinarily covered by fire and/or aircraft insurance.

Very truly yours,

(Owner)



Contract No. _____

HIRE OF PLANT OR EQUIPMENT BY GOVERNMENT

(With or without operating personnel)

DEPARTMENT OF THE ARMY

Contractor and address _____

Contract for _____

Amount \$ _____

Location _____

Payment to be made by Disbursing Officer, Fort Peck District, Corps of
Engineers, U. S. Army at Fort Peck, Montana

The supplies and services to be obtained by this instrument are authorized by, are for the purposes set forth in, and are chargeable to the following appropriation, the available balances of which are sufficient to cover the cost of the same:

This contract is authorized by the following laws:

CONTRACT FOR HIRE OF PLANT OR EQUIPMENT BY GOVERNMENT
(With or without operating personnel)

This contract, entered into this ____ day of ____, 195__, by the United States of America (hereinafter called the Government), represented by the contracting officer executing this contract, and _____

*a corporation organized and existing under the laws of the State of _____
*a partnership consisting of _____
*an individual trading as _____
of the City of _____ in the State of _____ (hereinafter called the contractor), Witnesseth that:

ARTICLE 1. Scope of this contract.--The contractor does hereby hire unto the Government for the term of _____, beginning _____ and ending _____, with all labor necessary for the operation thereof, the following described plant or equipment:

for the consideration of:

in strict accordance with Schedule "A" and with the specifications attached hereto and made a part hereof and designated as follows:

Delivery of the plant or equipment shall be made:

ARTICLE 2. Extension.--At the option of the Government this contract, with all its terms and provisions, may be extended for such period and as often as the Government may elect, so as to permit continuous use of said plant or equipment, not extending, however, beyond _____.

ARTICLE 3. Termination.--This contract may be terminated by the Government by giving _____ days' written notice at any time after _____ days from the date of the contract.

ARTICLE 4. Warranty.--The contractor warrants to the Government the quiet and peaceable use of the aforesaid property, and in case of any disturbance, by suit or otherwise, will defend the same free of charge to the Government in or before the proper state or United States courts.

ARTICLE 5. (a) Responsibility for plant or equipment.--At the expiration or earlier termination of this contract the Government shall yield up said property to the contractor in as good condition as when received, loss and damage by fire, act of God, and ordinary wear and tear excepted, and the contractor shall during the term of this contract, keep said property in good condition and fit for the use of which it was leased, except as otherwise specifically provided in the specifications. It is understood that the contractor releases the Government and its officers and agents from all responsibility for damages such as are ordinarily covered by fire and marine insurance.

*Delete all lines which do not apply.

(b) Contractor's responsibility.---The contractor shall be responsible that his employees strictly comply with all Federal, State, and municipal laws that may apply to operations under the contract; and it is understood and agreed that the contractor assumes full responsibility for the safety of his employees, plant, and materials and for any damage or injury done by or to them from any source or cause, except damage caused to plant or equipment by acts of the Government, its officers, agents or employees, in which event such damages will be the responsibility of the Government in accordance with applicable federal laws.

ARTICLE 6. Delays.---If the contractor refuses or fails to make delivery of the property within the time specified in Article 1, or any extension thereof, as provided in the specifications, or to maintain the property in serviceable condition and diligently and competently to conduct the specified operations as indicated by the contracting officer, the Government may, by written notice, terminate the right of the contractor to proceed with delivery or with further performance under the contract or such part or parts thereof affected by the delay. In such event the Government may use or procure similar property by contract or otherwise and the contractor shall be liable to the Government for any excess cost occasioned thereby. Unless otherwise provided in the specifications, the Government shall not be chargeable for out of service time due to breakdown not caused by the act or negligence of the Government or its agents.

ARTICLE 7. Payments.---Unless otherwise provided in the specifications, partial payments will be made at the end of each calendar month, or as soon thereafter as practicable.

ARTICLE 8. Disputes.---Except as otherwise provided in this contract, any dispute concerning a question of fact arising under this contract which is not disposed of by agreement shall be decided by the contracting officer, who shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the contractor. Within 30 days from the date of receipt of such copy, the contractor may appeal by mailing or otherwise furnishing to the contracting officer a written appeal addressed to the Secretary, and the decision of the Secretary or his duly authorized representative for the hearing of such appeals shall be final and conclusive; provided that, if no such appeal is taken, the decision of the contracting officer shall be final and conclusive. In connection with any appeal proceeding under this clause, the contractor shall be afforded an opportunity to be heard and to offer evidence in support of its appeal. Pending final decision of a dispute hereunder, the contractor shall proceed diligently with the performance of the contract and in accordance with the contracting officer's decision.

ARTICLE 9. Covenant against contingent fees.---The Contractor warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the contractor for the purpose of securing business. For breach or violation of this warranty the Government shall have the right to annul this contract

without liability or in its discretion to deduct from the contract price or consideration the full amount of such commission, percentage, brokerage, or contingent fee.

ARTICLE 10. Officials not to benefit.—No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this contract, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

ARTICLE 11. (a) Eight-hour law. No laborer or mechanic doing any part of the work contemplated by this contract, in the employ of the Contractor or any subcontractor contracting for any part of the said work, shall be required or permitted to work more than eight hours in any one calendar day upon such work, except upon the condition that compensation is paid to such laborer or mechanic in accordance with the provisions of this clause. The wages of every such laborer and mechanic employed by the contractor or any subcontractor engaged in the performance of this contract shall be computed on a basic day rate of eight hours per day; and work in excess of eight hours per day is permitted only upon the condition that every such laborer and mechanic shall be compensated for all hours worked in excess of eight hours per day at not less than one and one-half times the basic rate of pay. For each violation of the requirements of this clause penalty of five dollars shall be imposed upon the contractor for each such laborer or mechanic for every calendar day in which such employee is required or permitted to labor more than eight hours upon said work without receiving compensation computed in accordance with this clause; and all penalties thus imposed shall be withheld for the use and benefit of the Government.

(b) Convict Labor. In connection with the performance of work under this contract, the contractor agrees not to employ any person undergoing sentence of imprisonment at hard labor.

ARTICLE 12. Objectionable employees. The contractor will be required to discharge any employee who, in the opinion of the contracting officer, is objectionable or incompetent. This requirement shall not be made the basis of any claim for compensation or damages against the United States or any of its officers or agents.

ARTICLE 13. Non Discrimination in Employment. In connection with the performance of work under this contract, the Contractor agrees not to discriminate against any employee or applicant for employment because of race, creed, color, or national origin; and further agrees to insert the foregoing provision in all subcontracts hereunder except subcontracts for standard commercial supplies or for raw materials.

ARTICLE 14. Assignment of claims. (a) Pursuant to the provisions of the Assignment of Claims Act of 1940 as amended (31 U.S. Code 203, 41 U.S. Code 15), if this contract provides for payments aggregating \$1,000 or more, claims for moneys due or to become due the contractor from the Government

under this contract may be assigned to a bank, trust company, or other financing institution, including any Federal lending agency, and may thereafter be further assigned and reassigned to any institution. Any such assignment or reassignment shall cover all amounts payable under this contract and not already paid, and shall not be made to more than one party, except that any such assignment or reassignment may be made to one party as agent or trustee for two or more parties participating in such financing. Notwithstanding any other provision of this contract, payments to an assignee of any moneys due or to become due under this contract shall not, to the extent provided in said Act as amended, be subject to reduction or set-off.

(b) In no event shall copies of this contract or of any plans, specifications, or other similar documents relating to work under this contract, if marked "Top Secret", "Secret", "Confidential", or "Restricted", be furnished to any assignee of any claim arising under this contract or to any other person not entitled to receive the same; provided that a copy of any part of all of this contract so marked may be furnished, or any information contained therein may be disclosed, to such assignee upon the prior written authorization of the Contracting Officer.

ARTICLE 15. Patent indemnity.---The contractor agrees to indemnify the Government and its officers, agents and employees against liability, including costs and expenses, for infringement upon any Letters Patent of the United States (except Letters Patent issued upon an application which is now or may hereafter be, for reasons of national security, ordered by the Government to be kept secret or otherwise withheld from issue) arising out of the performance of this contract or out of the use or disposal by or for the account of the Government of supplies furnished or construction work performed hereunder. The foregoing indemnity shall not apply unless the contractor shall have been informed as soon as practicable by the Government of the suit or action alleging such infringement, and shall have been given an opportunity to present recommendations as to the defense thereof; and further, such indemnity shall not apply in any one of the following situations: (i) any infringement resulting from the addition to any such supplies of other supplies not furnished by the contractor for the purpose of such additions; (ii) Any settlement of a claim of infringement made without the consent of the contractor, unless required by final decree of a court of competent jurisdiction; (iii) Any claim of infringement arising from use or disposal outside the scope of any license limitation under which the contractor is bound, provided that the contractor has notified the Government of the limitation prior to first delivery under this contract; (iv) Any infringement necessarily resulting from changes (other than this substitution of another standard commercial part or component manufactured or supplied by the contractor) ordered pursuant to this contract, or from specific written instructions given by the contracting officer directing a manner of performing the contract not normally utilized by the contractor.

ARTICLE 16. Accident prevention.--(a) In order to provide safety controls for protection to the life and health of employees and other persons; for prevention of damage to property, materials, supplies and equipment; and for avoidance of work interruptions in the performance of this contract the Contractor will comply with all pertinent provisions of the manual "Safety Requirements" approved by the Chief of Engineers, 16 December 1941, as revised 16 April 1951, and as may be further amended, and will also take or cause to be taken such additional measures as the contracting officer may determine to be reasonable necessary for the purpose.

(b) The contractor will maintain an accurate record of, and will report to the contracting officer in the manner and on the forms prescribed by the contracting officer, exposure data and all accidents resulting in death, traumatic injury, occupational diseases, and/or damage to property, materials, supplies and equipment incident to work performed under this contract.

(c) The contracting officer will notify the contractor of any non-compliance with the foregoing provisions and the action to be taken. The contractor shall, after receipt of such notice, immediately correct the conditions. Such notice, when delivered to the contractor or his representative at the site of the work, shall be deemed sufficient for the purpose. If the contractor fails or refuses to comply promptly, the contracting officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop order shall be made the subject of claim for extension of time or for excess costs or damages by the contractor.

(d) Compliance with the provisions of this article by subcontractors will be the responsibility of the contractor.

ARTICLE 17. Definitions.--(a) The terms "Secretary of the Army" or "Head of the Department" as used herein shall have one and the same meaning; and the term "his duly authorized representative" shall mean the Chief of Engineers, Department of the Army, or an individual or board designated by him.

(b) Except for the original signing of this contract and except as otherwise stated herein, the term "Contracting Officer" as used herein shall include his duly appointed successor or his authorized representative.

ARTICLE 18. Alterations.--The following alterations have been made in the provisions of this contract:

PLATE J-5 (6)

IN WITNESS WHEREOF, the parties hereto have executed this contract as of the day and year first above written.

THE UNITED STATES OF AMERICA

By _____

(Contracting Officer)

Witnesses:

(Address)

(Address)

(Contractor)
By _____

(Title)

I, _____, certify that I am secretary of the corporation named as contractor herein; that _____ who signed this contract on behalf of the contractor, was then _____ of said corporation; that said contract was duly signed for and on behalf of said corporation by authority of its governing body and is within the scope of its corporate powers.

(Corporate
Seal)

(Secretary)



APPENDIX K

ENGINEER DEPARTMENT SUPPLIES & EQUIPMENT

1. General. The following material and property is available at the Fort Peck District Office, Fort Peck, Montana, for use in connection with emergency flood activities.

<u>No.</u>	<u>Item</u>	<u>Description</u>
1	Skiff, No. 106	14' length, wood construction, good condition
1	Skiff, No. 107	14' length, wood construction, good condition
1	Skiff, No. 108	14' length, wood construction, good condition
1	Skiff, No. 109	14' length, wood construction, good condition
1	Motor, outboard	5 h.p. "Johnson", No. 446553, good condition
1	Motor, outboard	5 h.p. "Johnson", No. 473159, good condition
1	Motor, outboard	5 h.p. "Johnson", No. 173141, good condition
1	Motor, outboard	9.7 h.p. "Evinrude", No. 4389-26399, good condition
1	Motor, outboard	22 h.p. "Evinrude", No. 6039-21438, good condition
24	Oars	
36	Vests, life	
3	Buoys, Ring	
60	Pr. Boots, rubber, Sizes 7 to 13	
4	Irons, Grapple	
70	Packets, Pocket, First Aid	
13	Picks, Railroad	
50	Shovels, Assorted	
150	Axes, single & double bit	
60,000	Bags, burlap	
7	Flashlights, 2 cell	
5	Automobiles, Station wagons	
5	Automobiles, Sedans	
10	Pickup Trucks	

<u>No.</u>	<u>Item</u>	<u>Description</u>
2	Trucks, 1½ ton, C.O.E. flat bed	
1	Truck, 5 ton, "IHC"	
1	Truck tractor, 5 ton with 30 ton semi-trailer	
2	Tractors, bulldozers, D-8, "Caterpillar"	
1	Tractor, bulldozer, R-4, "Caterpillar"	
1	Carryall, 12 cubic yard, "LeTourneau"	
1	Back hoe, 3/8 cubic yard, "Insley" with 3/8 yd. shovel attachment	
1	Michigan Motor Crane 1/4 yd. Drag bucket	
3	Suburban carryall	
4	Trucks, 3 yd Dump Boxes, "International" 2 ton 4 x 2	
2	Trucks, 2 yd Dump Boxes, "Chevrolet" 1½ ton, 4 x 4	
6	Jeeps, Willys Command Recon, 4 x 4	
1	Light Plant, Trailer Mounted, 4 Flood Lamps	
2	No. Galvanometers	
2	No. Batteries, exploding	
100	No. Caps, blasting, regular "Western"	
500	No. Caps, blasting, electric No. 6 (4', 6' and 8' leads)	
50	No. Caps, (exploders), elec, blasting, 1 delay, No. 6 (10' leads)	
80	No. Caps, (exploders), elec, blasting, 3 delay, No. 6 (10' leads)	

2. Emergency Operations. Reference is made to multiple letter from Office Chief of Engineers, dated 28 February 1949, subject: "Flood Emergency Preparation", which states in part, "During a flood fight it is incumbent upon the Corps of Engineers to insure that full use is made of local resources due to the limited Federal funds available for Flood emergency operations. In the event that suitable equipment cannot be obtained by local interests, the District Engineers have authority to make Government plant and supplies available under conditions outlined in paragraph 4227.10 of Orders and Regulations, as supplemented by letter ENGBI, 27 January 1949, subject: "Arrangements for Flood Fighting Assistance" to Commanding Officers, Engineer Depots and Engineer Supply Officers, General Depots, with copies to Division and District Engineers."

3. Sandbags. Reference is made to multiple letter from Office Chief of Engineers, dated 28 February 1949, subject: "Flood Emergency Preparation", which states in part, "During the war, sandbags were in extremely short supply and it was practically impossible for local interests to obtain them. As a result, the Corps of Engineers undertook to store quantities of sandbags at strategic points in order that they could be made available in time of emergency. As sandbags are now obtainable by local interests, this procedure will no longer be followed, and Division and District Engineers cannot be expected to stock enough sandbags for all emergency purposes. Local interests should be informed of this changed situation and that the policy which obtained prior to the war is again in effect. In event there are excess sandbags at a time when they are needed by local interests, such may be made available subject to future replacement".

4. The Fort Peck District has in storage at Fort Peck, Montana, 60,000 sandbags of which 8,650 are treated burlap bags and 51,350 are untreated bags. Local interests in Glasgow, Montana, have stored 2,000 sandbags in Glasgow at this time for possible future use.



RADIO FACILITIES

1. Radio facilities available in the Fort Peck District for use during flood emergencies consist of one 400 watt AM transmitter for point to point service operating on 5400 kilocycles with either voice or CW transmission, AM receivers for use with the transmitter, 5 two-way FM sets mounted in vehicles for mobile use, two portable FM receiver-transmitters and a 50-watt central station.

2. A radio net has been established in the Missouri River Division and the Fort Peck District operates station WUH 2 in the net on a frequency of 5400 kilocycles. Amateur radio operators are available for use in case of emergency to contact other amateur operators to obtain information on floods, flood stages and other pertinent data. The FM units operate on a frequency of 38,900 kilocycles with an approximate range of 25 miles for car-to-car communication or a range of approximately 60 miles between automobile and central station. (Possibility of 2350 to 5437.5 kilocycles due to installation of new radio station by spring).

3. The Montana State Highway Commission at the present time operates radio stations at Great Falls, Helena and Bozeman, Montana. It is anticipated that additional stations will be set up in the near future at Havre, Lewistown, Billings and Miles City, Montana. These stations have contact with highway equipment within range and operate on a frequency of 46.86 megacycles.

4. In addition to other mentioned means of radio communication a short wave system has been established between Sheriffs' Offices in Great Falls, Butte, Choteau, Livingston, Glasgow, Fort Benton, Malta, Wolf Point, Sidney and Helena, Montana and are available for use in the event of emergency.

5. In South Dakota radio facilities are in operation in the State Highway Department; the State Attorney General's Office; the State Highway Patrol and the State Game, Fish and Parks Department. In the event of emergency any of the above can be contacted to facilitate communication.

6. In Wyoming radio communication can be obtained by contacting any Highway Patrolman or any State Highway Department Unit.



COMMUNICATION SYSTEMS

RADIO STATIONS

<u>Basin</u>	<u>State</u>	<u>Station</u>	<u>Location</u>	<u>Frequency</u>	<u>Owner</u>
Yellowstone	Mont.	KGCX	Sidney	1480	E.E. Krebsbach
"	"	KOA 898	Sidney	39-40-46	Sheriff's Office
"	"	KOA 491	Glendive	46.86	Highway Department
"	"	KXGN	Glendive	1400	L. W. Moore
"	"	KRJF	Miles City	1340	Star Printing Co.
"	"	KOB 649	Miles City	46.86	Highway Department
"	"	KFMW	Miles City	39820	Highway Patrol
"	"	KGHL	Billings	790	Northwestern Auto Supply Co.
"	"	KOOK	Billings	970	The Montana Network
"	"	KMBY	Billings	1240	Billings Bcstg. Co.
"	"	KOIZ	Billings	39820	Highway Patrol
"	"	KOB 648	Billings	46.86	Highway Department
"	"	KPRK	Livingston	1340	
"	"	KOA 287	Livingston	39-40-46	Sheriff's Office
Big Horn	Wyo.	KODI	Cody	1400	
"	"	KOVE	Lander	1230	
"	"	KOB 384	Lander	1642	Highway Patrol
"	"	KPCW	Pcwell	1260	
"	"	KOA 826	Basin	1642	Highway Patrol
"	"	KWOR	Worland	1490	Joseph P. Ernst
Tongue	"	KWYO	Sheridan	1410	Big Horn Bcstg. Co.
"	"	KOA 340	Sheridan	1642	Highway Patrol
Powder	"	KOA 448	Gillette	1642	Highway Patrol
Missouri	Mont.	KXIQ	Bozeman	1450	KREB Broadcasters
"	"	KEMN	Bozeman	1230	Penn. Engrg. Co.
"	"	KBSO	Bozeman	39820	Highway Patrol
"	"	KOA 555	Bozeman	46.86	Highway Department
"	"	KXLJ	Helena	1240	
"	"	KFDW	Helena	1340	Lewis & Clark B/G Co.
"	"	KOA 996	Helena	39-40-46	Sheriff's Office
"	"	KOA 564	Helena	46.86	Highway Department
"	"	KHMP	Helena	39820	Highway Patrol
"	"	KMON	Great Falls	560	Mont. Farmer Bcstg. Co.
"	"	KFBB	Great Falls	1310	Buttrety Bcstg. Co.
"	"	KXLK	Great Falls	1400	Great Falls Bcstg. Co.
"	"	KPGF	Great Falls	39820	Highway Patrol
"	"	KOA 216	Great Falls	39-40-46	Sheriff's Office
"	"	KOA 553	Great Falls	46.86	Highway Department
"	"	KOA 810	Fort Benton	39-40-46	Sheriff's Office
"	"	KXLO	Lewistown	1230	Capital Bcstg. Co.
"	"	KOB 702	Lewistown	46.86	Highway Department
"	"	KOA 823	Wolf Point	39-40-46	Sheriff's Office

<u>Basin</u>	<u>State</u>	<u>Station</u>	<u>Location</u>	<u>Frequency</u>	<u>Owner</u>
Teton	Mont.	KOA 287	Choteau	39-40-46	Sheriff's Office
Marias	"	KIYI	Shelby	1230	
Milk	"	KOJM	Havre	610	No.Mont.Bcstg.Co.
"	"	KOB 715	Havre	46.86	Highway Department
"	"	KOA 822	Malta	39-40-46	Sheriff's Office
"	"	KOA 822	Malta	39-40-46	Police Department
"	"	KOA 565	Glasgow	39-40-46	Sheriff's Office
"	"	WUH 2	Fort Peck	5400	Corps of Engineers
"	"	WUH 2	Fort Peck	39800	Corps of Engineers
Cheyenne	Wyo.	KOA 451	Newcastle	1642	Highway Patrol
"	S.Dak	KDSJ	Deadwood	1450	
"	"	WCAT	Rapid City	1230	School of Mines
"	"	KOTA	Rapid City	1380	Black Hills Bcstg. Co.
"	"	KAB 516	Rapid City	3918	Highway Patrol
"	"	KGFX	Pierre	630	
"	"	KAB 519	Pierre	3918	Highway Patrol
Missouri	Mont.	KOE	Wolf Point	46.86	Highway Department

APPENDIX L

SAFETY

1. General. Established policies of the Corps of Engineers require that adequate provisions for the safety of equipment and personnel engaged in emergency flood fighting be included in the District Emergency Flood Plan. Accordingly, care will be exercised during flood emergencies to avoid unnecessary exposure to injury or damage to equipment or other property.

2. District personnel that are assigned to flood fighting will comply with pertinent provisions of the Corps of Engineers handbook "Safety Requirements", latest revised edition, and with any existing and special District Safety regulations. It will be the responsibility of each Chief of Field Party, before going on an emergency flood mission, to insure that proper safety equipment is taken and that personnel assigned to the party are thoroughly familiar with its use and the safe methods for performing their work. Contract or hired labor emergency construction work shall be executed in accordance with safe working methods and practices.

3. During flood emergencies, safety personnel will continue their safety engineering duties and not be assigned to other work.



APPENDIX M

FERRIES IN FORT BEND DISTRICT

<u>River</u>	<u>Location</u>	<u>Gross Tonnage</u>	<u>Const</u>	<u>Type</u>	<u>No. of Operators</u>	<u>Owner</u>
Missouri	Carter, Mont.	20	Steel	Ferry Cable	1	Choteau County, Fort Benton, Mont.
Missouri	Virgelle, Mont.	20	Steel	Ferry Cable	1	Choteau County, Fort Benton, Mont.
Missouri	Loma, Mont.	20	Steel	Ferry Cable	1	Choteau County, Fort Benton, Mont.
Missouri	Iliad, Mont.	9	Steel	Barge	1	Choteau County, Fort Benton, Mont.
Missouri	Poplar, Mont.	--	Steel	Barge	1	Poplar Ferry Association
Missouri	Brockton, Mont.	--	----	----	--	Lars Larson, Brockton, Montana
Missouri	Power Plant Ferry near Zortman, Mont.	--	----	----	--	Frisble Ekregen, Harlem, Montana
Missouri	Oswego, Mont.	--	----	----	--	-----



APPENDIX N

CRITICAL FLOOD AREAS AND EXISTING FLOOD CONTROL WORKS

MISSOURI RIVER AND TRIBUTARIES

1. Danger to life from floods on the main stem of the Missouri River is considered almost negligible between Fort Peck and the confluence of the Yellowstone River. Operation of Fort Peck Dam eliminates almost all danger of floods in this reach on the Missouri River proper. However, severe floods have occurred sporadically over the watersheds of Big Muddy Creek, and the Poplar River, both being tributaries which enter the Missouri River from the North in this stretch. Heavy rains of several days' duration, flash floods, or rapid runoff from snowmelt may be expected to create flood conditions on small streams in the area with attendant damage to private property, roads, bridges and railroad embankments which may result in the complete isolation of small communities.

2. Major damage to ferries and ranch buildings on the main stem of the Missouri River immediately above Fort Peck Reservoir was caused during the March 1947 thaw when an abnormally thick ice cover broke up and was carried down the river by flood water from snowmelt runoff. The combination of runoff from heavy rainfall and rapid snowmelt during May and June 1948 caused serious flooding along the reach of the Missouri River from its headwaters to the Fort Peck Reservoir with consequent damage to roads, bridges and farm property. Similar conditions caused flooding along various minor tributaries of the Missouri during this same period. The towns of Craig, Montana and a portion of the City of Great Falls sustained damage during this flood and are subject to damage from future floods of a similar magnitude. Some danger of life exists in this area and some rescue work may be necessary. Minor flooding from sewer back-up and seepage through walls occurred in the Town of Fort Benton in January 1949, and was caused by an ice jam which formed at a sand bar located downstream from the County bridge over the Missouri River at Fort Benton, Montana.

3. Jefferson River. Flooding caused by runoff from heavy rainfall, by rapid snowmelt runoff, by ice jams and by a combination of these conditions, has occurred in the past on the Jefferson River and its tributaries. During May and June 1948, flooding occurred along the entire length of the Jefferson River causing extensive rural damage and flooding portions of the towns of Twin Bridges, Jefferson Island and Three Forks, Montana. Occurrence of similar floods in this reach will cause extensive property damage with some danger to life. The town of Harrison, Montana, is subject to flooding from Willow Creek.

4. Gallatin River. Runoff from rapid snowmelt, heavy rainfall runoff and combinations of these factors has caused flooding along the Gallatin River and its main tributary, the East Gallatin. The City of Bozeman, Montana, has sustained damage in the past due to runoff from the creeks and coulees above the city. Recurrence of floods similar to those

in the past will cause damage within the City of Bozeman and will also cause extensive rural damage along the Gallatin River and tributaries.

5. Madison River. Serious rural damage was caused along the Madison River in January and February 1949 due to a series of ice jams which caused the river to breach an existing levee at several points, flooding farm land in the area, and forcing several farm families to vacate their homes, besides overtopping U. S. Highway 10 east of Three Forks, Montana and damaging the grades of the Northern Pacific and Milwaukee Railroads. Repair and strengthening of this levee was completed by local interests and the Corps of Engineers in 1950. Since the Madison River is regulated somewhat by storage reservoirs, danger from open water flooding is considered negligible.

6. Big Hole River. Floods on this river may result from heavy rainfall, ice jams, or runoff from rapid snowmelt. Agricultural lands, irrigation facilities, roads and bridges suffer to some extent from overflow. During the May - June 1948 flood period a peak gage reading recorded on the Big Hole River was 7.70 feet with a flow of 13,800 c.f.s. at Melrose, Montana on 30 May 1948.

7. Sun River. Heavy rainfall and runoff from rapid snowmelt or a combination of the two have caused extensive flooding along the entire length of the Sun River and its tributaries. During the May - June 1948 floods a peak flow of 13,600 c.f.s. with a gage height of 10.30 feet was recorded at Vaughn, Montana. Heavy rainfall on 16 and 17 June 1950 caused light municipal and road damage in the towns of Fort Shaw and Sun River, Montana. The towns of Augusta and Sun River, Montana and the City of Great Falls, Montana, have suffered considerable flood damage in the past. Danger to life and necessity for some families to vacate their homes may exist during any major flood, especially if a sudden rise should occur without warning.

8. Marias River. Floods on this river and its tributaries may result from ice jams, periods of continuous rainfall and storms of cloudburst intensity or a combination of these factors. During June 1948 heavy rains and cloudburst storms caused flooding along the entire length of the main stem of the Marias River and on a majority of the tributary streams. A peak flow of 39,000 c.f.s. was recorded at Shelby and 51,000 c.f.s. at Brinkman. Extensive damage was caused to county roads and bridges and to Federal highways, irrigation facilities, railroads and farm property. Minor damage was caused in the towns of Conrad, Ledger, and Loma, Montana due to overbank flooding and seepage. Future damage may be expected from flooding of the same type and as numerous buildings were flooded during the 1948 floods, loss of life may be expected in the event of a flash flood.

9. Teton River. Periods of heavy and continuous rainfall have caused flooding on the Teton River in the past. Property damage has been light in the upper reaches due to the undeveloped nature of the

valley, however, in the lower, more highly developed reaches of the river extensive damage has been caused to roads and bridges, irrigation and power facilities, crops and farms. Future flooding may be expected on the Teton River with some danger to life.

10. Musselshell River. Snowmelt runoff, heavy rains, and cloudburst storms have caused flooding on the Musselshell River and its tributaries in the past. During June 1948, heavy rains and snowmelt runoff caused occasional overbank flooding from Martinsdale to Roundup, Montana. A peak flow of 2,250 c.f.s. was recorded at Harlowton, Montana on 6 June 1948. Minor flooding occurred in the Town of Roundup, Montana, and damage occurred on several tributaries from flash floods caused by cloudburst storms. On 17 June 1950 a cloudburst storm on Antelope Creek, which enters the Musselshell River at Harlowton, Montana, caused major damage to agriculture land, farm buildings, irrigation and levee facilities, roads, bridges, railroads and to residences and industrial property in Harlowton. As a result of the flood one life was lost. Estimated discharge of this flash flood at Harlowton is 24,400 c.f.s. Future flooding may be expected in the Musselshell River Basin under similar conditions. Some danger to life exists from flash floods caused by storms of cloudburst intensity.

11. Milk River. Floods on the Milk River may result from ice jams, periods of continuous rainfall, and storms of cloudburst intensity or a combination of these factors. Major floods will necessitate rescue of some families in the rural areas along Milk River, probably between Hinsdale and the confluence of the Milk River with the Missouri River. Floods at Havre have occurred from ice jams and high river stages on the Milk River and from flash floods on Bull Hook Creek. Floods from the Milk River have caused damage along the south edge of Chinook and flash floods on Red Rock Coulee and Lodge Creek have caused damage to residential sections of the town. At Harlem the entire area north of the Great Northern Railway tracks has been inundated by overflow of Thirty Mile Creek, a tributary of the Milk River. Flood stages have been reached by flows on the Milk River at Malta with some damage to buildings and residences adjacent to the river. Prior to 1940 Saco was subject to frequent inundation from Beaver Creek, a tributary of the Milk River. During the latter part of 1939 local interests constructed a levee system to protect the town from flood waters. The west section of this levee was repaired and strengthened by the Corps of Engineers in 1951. Glasgow is protected by a levee built in 1938 under the supervision of the Corps of Engineers. This levee protects the town against floods of 57,000 c.f.s. on the Milk River and from floods of 3,000 c.f.s. on Cherry Creek. Some damage is still caused by runoff from the hills immediately north of town.

YELLOWSTONE RIVER AND TRIBUTARIES

The Yellowstone River Valley has suffered damage from several large floods in recent years. Ice jams, runoff from snowmelt, local and general rains and combination of these factors have all caused

damaging floods. Practically all the bottom lands along the Yellowstone River from Livingston, Montana, to its confluence with the Missouri River are subject to inundation by floods with consequent damage to property and some danger to life. The following towns or cities have all suffered flood damage in the past and are susceptible to future flooding from the Yellowstone River main stem or its minor tributaries: Livingston, Billings, Pompeys Pillar, Rosebud, and Miles City. Forsyth, Montana, along the main stem, is protected by a levee built in 1948 under the supervision of the Corps of Engineers. This levee protects the town against a flood of 140,000 c.f.s. on the Yellowstone River.

1. Shields River. Periods of rapid snowmelt or heavy rains in the Shields River Basin may cause flooding which will result in considerable damage to farm lands and some loss of livestock. During the 1948 flood, considerable damage was caused to roads, bridges, farms, agricultural land and railroad right of way. Several families were isolated by floodwater for approximately four weeks during the 1948 flood. The Corps of Engineers constructed emergency projects on Shields River in 1950, consisting of two bridge protection projects and a channel improvement project. These projects afford protection to farm lands, irrigation systems, highway and a railroad.

2. Clarks Fork River. Floods on the Clarks Fork River may be caused by heavy rains, ice jams, or rapid snowmelt during the spring thaw. During the flood of February 1948 damage was caused to farms, buildings, roads and some livestock was lost by drowning. Danger to life is considered negligible.

3. Big Horn River. Floods on this river may result from heavy rainfall or cloudbursts, ice jams, or spring thaw and rapid snowmelt. Agricultural lands in the Big Horn River basin suffer to some extent from overflow. Four towns, Thermopolis, Worland, Manderson, and Greybull, Wyoming have suffered considerable flood damage in the past. Danger of life in the area is believed small due to proximity of high ground along most of the river valley.

4. Little Big Horn River. Floods on this river may result from ice jams, rapid snowmelt, or heavy rainfall. Considerable property damage may result from recurrence of past floods with minor possibility of loss of life.

5. Shoshone River. Ice jams and resultant high stages caused flooding on the Shoshone River in February 1948 and 1949. Danger to life in this area is considered negligible, however, extensive damage to irrigated land may be caused by high river stages in conjunction with ice jam conditions or by runoff from rapid snowmelt or heavy rainfall.

6. Tongue River. Heavy rains and rapid snowmelt, particularly when aggravated by ice jams, cause extensive damage to rural property along the course of the Tongue River. Loss is most severe in the Wyoming reach of the stream where the comparatively narrow valley has been

intensively developed by irrigation and high cost farm buildings. Loss in this area has been to buildings, crops, irrigation systems, livestock, roads, and bridges. In the past, and potentially in the future, the towns of Monarch, Dayton, and Sheridan, Wyoming have sustained repeated flood losses. The area traversed by the Tongue River in Montana is sparsely settled range country, and with the exception of an irrigated section above Miles City, damage is largely confined to the overflow of pasture land, and the erosion of road and bridge embankments. Miles City, Montana has been damaged in the past by floods on the Tongue River, and is partially protected by a levee on the right bank of the stream.

7. Powder River. Heavy rains, rapid snowmelt, or ice jams have caused considerable flooding of bottomlands along the entire Powder River watershed. Buffalo, Wyoming has suffered damage from cloudbursts on Clear Creek, a tributary of this river. Ice jams during spring runoff have produced property loss and forced several families to vacate their homes in Broadus, Montana.

MOREAU RIVER

The course of the Moreau River is through a sparsely settled region with but few small towns, none of which have had serious flood problems. Principal flood damage has been to road and bridge approaches, with minor property loss resulting from the overflow of pasture lands during spring runoff and in conjunction with ice jams. Flash floods and rapid runoff from rains and snowmelt cause sporadic flooding on tributary streams of the Moreau, with resultant loss to farm property and livestock.

GRAND RIVER

Ice jams, augmented by rapid snowmelt runoff, have caused considerable flooding of agricultural land and property damage throughout the Grand River Basin. During April 1950 the greatest flood of record occurred in the Grand River Basin, and was caused by major ice jams and rapid runoff from a heavy, wet snow which fell over the basin during the first part of April. Snow depths on 10 April 1950 varied from 4 to 24 inches throughout the basin. A peak flow of 83,100 c.f.s. was recorded at Wakpala, South Dakota on 18 April 1950. Major damage was caused to agricultural land, roads, bridges, railroads and urban communities along the entire reach of the river. The June rise on the river and high water stages due to excessive rainfall have also caused flooding along the river. Danger to life and necessity for some families to vacate their homes exists during any major flood.

CHEYENNE RIVER AND TRIBUTARIES.

1. Flood damage along the main stem of the Cheyenne River has been limited to the overflow of pasture lands, and minor damage to bridge abutments and road embankments. Danger to life is not considered

great. However, at Rapid City, on Rapid Creek, a tributary of the Cheyenne, high peak flows could result in extremely heavy loss of life and property. A cloudburst storm accompanied by heavy hail caused considerable property damage in the Canyon Lake District of Rapid City on 15 August 1949. Serious flooding has also occurred on other tributaries of the Cheyenne River, particularly in the Black Hills area.

2. Fall River. Several destructive floods caused by excessive rainfall of cloudburst proportions have occurred in the past in the Fall River Basin. Highways, railroads, buildings, crops and the town of Hot Springs, South Dakota have suffered extensive damage from these flash floods. Seventeen lives are known to have been lost during past floods. The City of Hot Springs has been provided with partial protection against flooding by the Channel Improvement Project which was completed in July 1949 under supervision of the Corps of Engineers. Complete protection will be provided for the city upon completion of the Cold Brook and Cottonwood Springs dams in the head water area of the Fall River. Cold Brook Dam is now under construction.

3. Belle Fourche River. Areas most subject to flooding on the main stem of the Belle Fourche River are: the upper valley above Belle Fourche, the City of Belle Fourche, the Belle Fourche irrigation district, and the lower valley. With the exception of flood damage at the town of Belle Fourche, losses have been principally to roads, bridge abutments, irrigation systems, and, as a result of overflow, deposition of debris on farm and pasture lands. The Town of Belle Fourche is situated at the junction of Hay Creek, Redwater River, and the Belle Fourche River. Concomitant high stages on the three streams create a definite flood hazard which is only partially alleviated by the levee which was constructed in 1939 under the supervision of the Corps of Engineers. The Town of Sturgis is subject to flood damage from Bear Butte Creek, and the City of Spearfish has been damaged severely by overflow from Spearfish Creek.

APPENDIX O

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